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THE IRON AGE

Contents

SEPTEMBER 21, 1939

High Point for the A. I. S. E. ... 31
Trends in Steel Mill Equipment ... 33
Steel Engineers Assemble Next Week ... 36
What the Executive Should Know About Job Rating ... 39
Beryllium—A Versatile Element ... 42
Steel Standardization ... 46
Flame Gouging for Grooving Steel ... 50
Hydraulic Types Predominate in Recent Press Designs ... 53
On the Assembly Line ... 60
Washington News ... 64
NEWS OF THE WEEK ... 82
Statistics on Metal-Working Activity ... 84
Weekly Ingot Operating Rates ... 89
Rate of Activity in Capital Goods ... 89
Plant Expansion and Equipment Buying ... 106

▼ ▼ ▼

New Industrial Literature ... 26
Just Between Us Two ... 118
Products Advertised ... 121
Index to Advertisers ... 148

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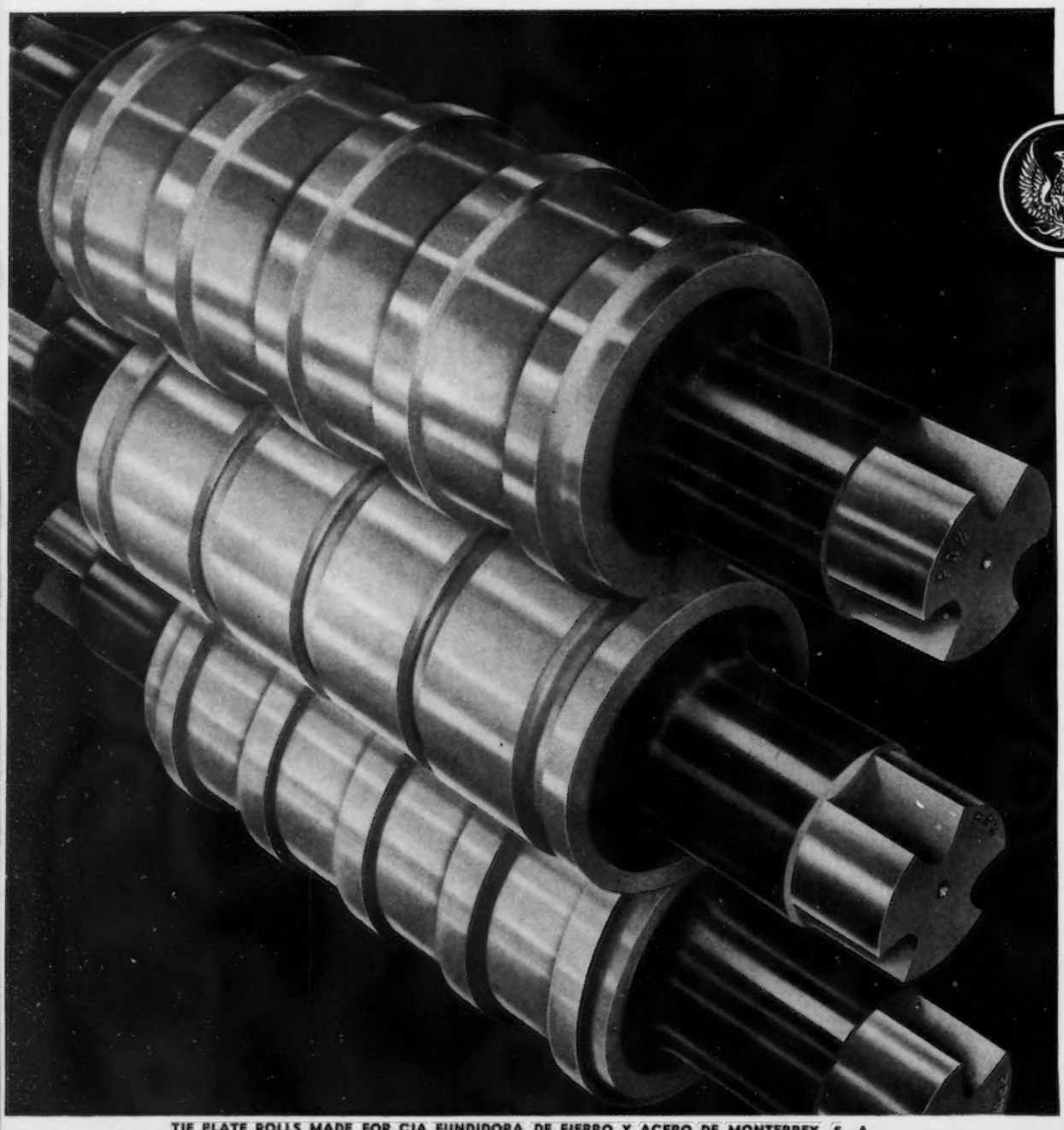
LESS COST PER TON OF STEEL ROLLED



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▲▲▲ THE IRON AGE ▲▲▲

SEPTEMBER 21, 1939

ESTABLISHED 1855 Vol. 144, No. 12

High Point for the A. I. S. E.

NEXT week, the Association of Iron and Steel Engineers holds its annual convention in Pittsburgh.

The present association was originally organized in 1907 as the Association of Iron and Steel Electrical Engineers. Pittsburgh was its birthplace. It came into being at a time when electricity was first making itself felt as an important factor in steel production. Steel operating men did not then know any too much about the problems and possibilities of electricity and electrical equipment men did not know any too much about steel.

Today, that situation is completely changed. Electricity is an accepted part of steel making. And our specialized electrical steel mill experts in the apparatus plants know as much about steel as the steel man himself.

All of this, of course, has been for the good of both parties. But today these parties consider themselves as one. That was why in 1936 the name of this organization was simplified to Association of Iron and Steel Engineers.

The meetings of this association draw immense attendance, particularly of operating men. They get down to "brass tacks" or perhaps we should say "steel facts." In addition to its 2200 members, the association draws and welcomes interested nonmembers to its meetings.

Probably the greatest single accomplishment of the Association was in being the creator of the National Safety Council. The sponsorship of industrial safety, as developed by the Association, was probably the first directed effort along this line in any industrial field. In the 1912 convention at Milwaukee it was quite evident that the safety activities were becoming so diverse as to necessitate divorcing from the Association organization. At that point, the National Safety Council came into being to go its own way.

The forthcoming exhibit and meeting at Pittsburgh the week of Sept. 25 undoubtedly presents the high point to date of the activities of the organization. The equipment exhibition and broad nature of the technical papers to be presented denote the increasingly broad and increasingly important role being played by the organization.

Up Goes Production
with INLAND LEDLOY

● Here's another impressive record made by Inland Ledloy —a 47% increase in hourly production of small gear blanks.

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You can expect these same important savings in your own machining operations when you use Ledloy. Isn't it worth a trial order for test, to obtain these advantages:

- machining speeds increased 30% to 100%.
- tool life lengthened 50% to 200%.
- saving of several dollars—even up to $50 or more—per ton of steel machined.

Inland Ledloy is the original lead-bearing steel developed by Inland metallurgists, and announced to the industry in 1938. In each SAE analysis Ledloy possesses the same physical characteristics as ordinary steel—except for its better machinability and slightly reduced grain size.

A sensible step toward enjoying Ledloy money savings is to call Inland—or write for Inland Ledloy Bulletin (No. 50).

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INLAND LEDLOY
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INLAND PRODUCTS INCLUDE: *SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS*

CHARLES M. SCHWAB IS DEAD

Steel master passes away at 77 after a colorful career

C. M. SCHWAB at his desk when he was 70 years of age.

CHARLES M. SCHWAB, chairman of the board of Bethlehem Steel Corp., and one of the founders of United States Steel Corp., died Monday, Sept. 18, at his home at 290 Park Avenue, New York City.

Coronary thrombosis ended Mr. Schwab's life at 77 years after a brief illness which started last month in London. Several times during recent years he had fought off attacks of serious illness but on Aug. 31 New York ship news reporters who often had interviewed the steel master after his trips abroad saw him carried off the U. S. liner *Washington* on a stretcher.

His funeral was tentatively scheduled to be held at St. Patrick's Cathedral, New York, on Thursday morning at 10 o'clock. At the Carmelite cloister in Loretto, Pa., where Sister Cecelia, a sister of Mr. Schwab, had lived for 25 years without seeing her brother, nuns assembled in prayer as they received word of his death. Industrialists were saddened. In New York Mayor La Guardia said that Mr. Schwab "was quick to grasp and institute changes that have made industry what it is today."

The Sweeper of Braddock

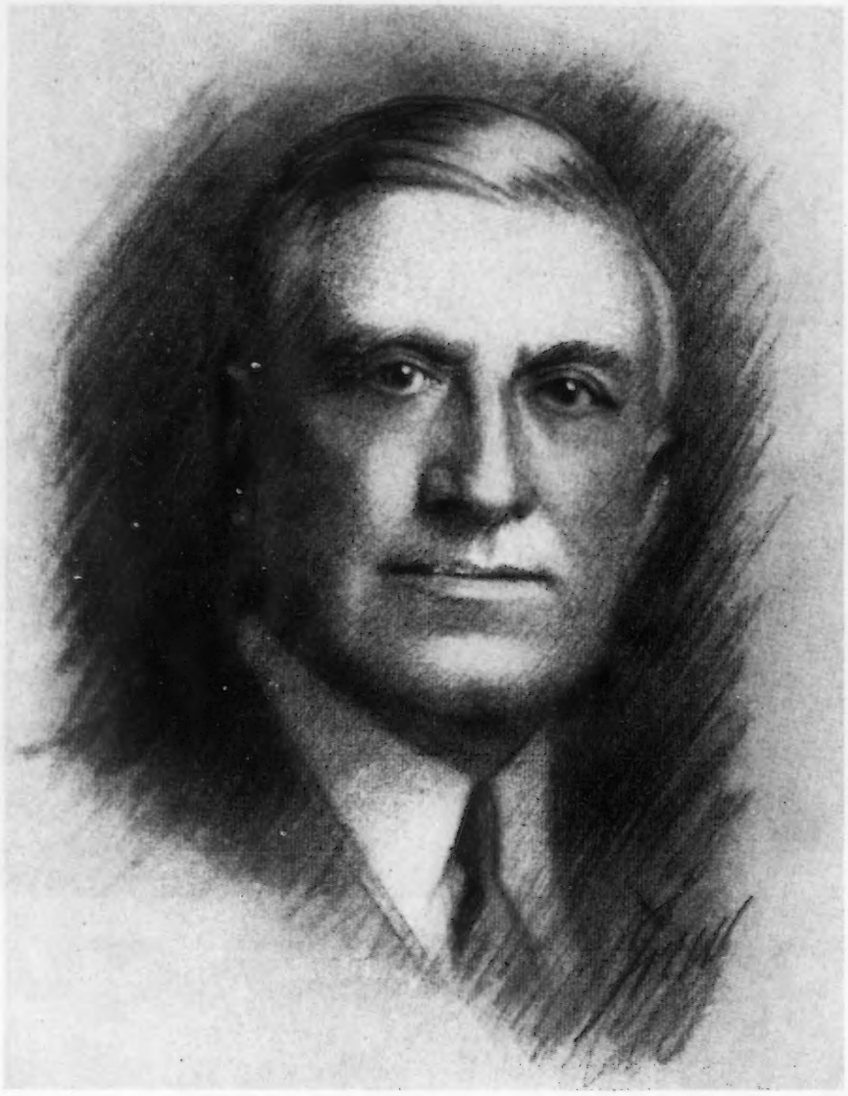
At 17, however, the builder of the Bethlehem company and the man about whom more steel traditions have centered than any other, was a sweeper and utility boy in the Spiegelmire store at Braddock, Pa. Eight years later he became general manager of the Carnegie company's Homestead works, then and now one of the largest steel plants in America. His career was to parallel the period of this country's greatest industrial development.

A Meteoric Career

Although the Bethlehem leader frequently asserted that "getting along in life was largely a matter of luck," the Schwab vigor and versatility were rooted in a strong heritage. His father had been a weaver, an innkeeper, the operator of a livery stable and of a mail coach but finally became a woolen manufacturer who obtained an order to make blankets for the Union Army in his mill at Williamsburg, Pa., where, on Feb. 18, 1862 Mr. Schwab was born. When he was 10 years old his father moved to Loretto a western Pennsylvania hamlet of 200 persons, where the boy was enrolled in the St. Francis College for two years.

You Want to Get Out

School, however, was not to occupy much of the ambitious young villager's time, and when his father said: "Charlie, you want to get out of Loretto, there is too little opportunity here to satisfy you," the boy went to Braddock, Pa., to work in a store not far from the Edgar Thomson steel works of Andrew Carnegie. He slept in the store, rose at 6 o'clock each morning, swept the floor and waited on early customers who came in before the regular clerks arrived. One customer who bought from young Schwab was the famous Captain Billy Jones, then a neighborhood figure



A PORTRAIT of Mr. Schwab which was drawn a few years ago for *The Iron Age* by John Frew and one that Mr. Schwab particularly liked. . . .

"greater than J. P. Morgan." When Schwab, never at loss for words, talked Jones into giving him a job at the steel plant, it was the real beginning of a meteoric career. Within two years Schwab had become chief engineer of the Edgar Thomson works.

The meeting with Jones was described by Mr. Schwab himself as "luck." In any event, the young man immediately studied steel plant engineering and endeared himself to Captain Jones, a rule-of-thumb, trial-and-error engineer whose fertile mind had invented the Jones mixer. Meanwhile the uses of chemistry and physics in predetermining the qualities of steel were just becoming known. Lack of money, which was to bother Schwab less in later years, was then a problem, since the young engineer had married Emma Eurana Dinkey, of Braddock, on May 1, 1883, and the expense of setting up a new home was a strain on his pocketbook. He made some extra money by giving piano and organ lessons but it was Henry Phipps a friend of Andrew Carnegie, who loaned $1,000 for laboratory equipment which was set up in Mrs. Schwab's sewing room in the Schwab cottage.

Read and Analyzed

Nightly young Schwab brought home samples of steel to analyze them for their various properties, develop methods of heat control and mixtures, and take other steps in the early stages of steel metallurgy. Schwab corresponded with other pioneers in this line, subscribed to foreign magazines, and read eagerly all he could lay his hands on regarding the physical sciences as applied to steel manufacture.

Carnegie Selects Schwab

Six years passed and the steel industry was rapidly growing with the expanding needs of the nation. New vigorous leaders were needed, Andrew Carnegie had acquired the huge steel plant at Homestead and, when its superintendent had difficulties, Carnegie asked Captain Jones to make a recommendation. "Charlie is the man," Jones said, and at 25 Schwab was placed in charge of the Homestead works. When Jones was killed in a mill accident in 1889 Schwab was appointed his successor as general superintendent of the Edgar Thomson works.

Heals Homestead's Wounds

It was the Edgar Thomson post which gave Schwab's greatest talent—that of organizing men to work together—an opportunity for action. His magnetic smile, which was to become world famous, his contagious optimism, his tact and his encouraging friendliness were strongly needed in an industry which had developed into a rough and tumble battle in which financial powers of the country were struggling for control of steel. Healing of wounds remaining after the Homestead strike of 1892 was Schwab's next task. The basis of relationship which he set up at Homestead met with success, leaving Andrew Carnegie overjoyed at the way the situation, which had jeopardized his own fortune and reputation, had turned out. H. C. Frick, Carnegie's most powerful partner with whom Carnegie broke in later years, did not hesitate to give credit to the 30-year-old Schwab for his part in the Homestead affair and Carnegie recognized Schwab's outstanding ability. Carnegie's admiration grew and in 1897 he offered Schwab the vice-presidency of the Carnegie Steel Co., Ltd., in training for the presidency.

Head Man or Nothing

"I do not want to be vice-president," Schwab to Carnegie, "because in that position I would be second man and I would be no good, but as manager of all these works I am very happy and I prefer to stay manager." Carnegie is said to have laughed and in a short time appointed Schwab (then 35) to the presidency of the Carnegie company. "Charlie" Schwab was ready to become a world-famous figure.

Meanwhile capital in all sections of the country was being poured into steel plants and New York and Chi-

cago financiers were attempting to break Pittsburgh's grip on that industry. The tough little Scotch steel master, Carnegie, would not be downed and was prepared to parallel any plant which aimed to dispute his supremacy. But Carnegie (Schwab knew) was eager to retire, after his long, hard battle on the upward road from poverty, and had no desire to get into a new era of battles if a way out could be found.

In 1900, Mr. Schwab was a visitor in New York. Several friends arranged a dinner in his honor. Among those present was J. P. Morgan, with some of his banker friends. Immediately Schwab seized the opportunity to make a speech. He knew that Mr. Morgan was skeptical of the profit-making possibilities of a huge steel combine. Yet he was the only man in the country who could complete such a combine. Facing him was Charlie Schwab, perhaps the one man in the country who had the personality, the energy, the optimism and the knowledge to sell Morgan the combine idea. Schwab's talk impressed even the doubting Morgan and the chief figures in the financial and legal world did their share in composing the various interests involved. Schwab acted as conciliator between Carnegie, the country's greatest industrialist, and Morgan, its leading banker.

Headed U. S. Steel

Terms were at length concluded and Mr. Schwab was able to complete his greatest selling job, the transfer of all the Carnegie interests to the Morgan group for $478,556,160. A condition insisted upon by Mr. Morgan was that Schwab, now 39, serve as first president of the new United States Steel Corp. Schwab had evaluated the properties that were to go into the combine, had listed the companies to be acquired and had dictated the price to be paid for each company. It is said that Morgan accepted Schwab's plan for the purchase without changing a comma.

The only issue remaining to be settled was Charlie Schwab's pay as head of the corporation. His contract with Carnegie guaranteed him a million dollars a year but Morgan, who was opposed to such a fixed obligation, regarded the contract as an obstacle. Thereupon Schwab tore up the contract, proposing instead that he receive 2 per cent of all in excess of $70,000,000 gross business done by the new combine in the first year, an arrangement which soon brought the young man more than $2,000,000.

After three years as head of U. S. Steel, Mr. Schwab, who in 1901 had purchased an interest in the Bethlehem Steel Co., a $15,000,000 enterprise which at that time specialized in production of ordnance, left U. S. Steel to devote his time to the Bethlehem concern. By 1930 this company had become the Bethlehem Steel Corp., with assets of nearly $750,000,000 and annual sales above $260,000,000. In 1914, however, the Bethlehem company was still fighting for its place in the sun. Then the World War broke out and Mr. Schwab crossed the Atlantic to book orders which were to bring great profits to his company and prove a mainstay of the Allies' munitions for the next four years. Later, Lloyd-George, Prime Minister of Britain, was to say:

"The first American to aid us was Charles M. Schwab. He gave us the necessary equipment to continue the war to a successful ending. The Kaiser offered Schwab threefold the sum we were paying him if he would throw up our contracts, but Schwab refused, and by so doing played a big part in the victories of the Allies."

Division of Labor

Profiting by the experience of Mr. Carnegie, in getting results by permitting men to develop their capabilities, C. M. Schwab relied increasingly upon his colleagues. In 1913, he had appointed E. G. Grace as president of Bethlehem Steel Co., the operating subsidiary, and in 1916 as president of Bethlehem Steel Corp. Mr. Schwab's own energies were directed now largely to conferences with the Allies, with Kitchener until the latter's death, with Winston Churchill, with Joffre and Foch.

Bethlehem was adding rapidly to its facilities. In 1916 it had acquired the Pennsylvania Steel Co., with its large rail making plant at Steelton, Pa.; and the Maryland Steel Co., located at Sparrows Point, near Baltimore, which was an advantageous base for Eastern markets and exports.

Its shipbuilding operations at Fore River, Mass., and San Francisco, Cal., were going at capacity. In 1917, it had purchased the American Iron & Steel Mfg. Co., at Lebanon, Pa., a large producer of bolts, nuts and rivets.

Then in 1917 Mr. Schwab left the steel business. President Wilson summoned him to Washington. The President announced that Mr. Schwab had been named as Director General of the Emergency Fleet Corp. Mr. Schwab suggested that his responsibilities to Bethlehem and the manufacture of munitions were so extensive and so important to the allies that he ought not to be taken away from these operations.

"Do you believe in the Selective Service Act?" the President asked. "Yes," Mr. Schwab answered. "Then," said the President, "you are drafted."

After the war Bethlehem Steel continued to grow and the stature of its chairman as a public figure continued

Some Milestones In Mr. Schwab's Life

1862, Feb. 18—Born Williamsburg, Pa.

1878—Became a sweeper and general utility boy at the Spiegelmire store, Braddock, Pa.

1879—Entered service of Carnegie companies, as laborer in engineering corps, Edgar Thomson steel works.

1881—Chief Engineer and assistant general manager, Edgar Thomson steel works.

1887—Superintendent, Homestead steel works.

1889—General superintendent, Edgar Thomson steel works.

1892—General superintendent, Edgar Thomson and Homestead, with headquarters at Homestead.

1897—President, Carnegie Steel Co., Ltd.

1901—President, United States Steel Corp., which he helped form.

1905—President and chairman of board, Bethlehem Steel Corporation.

1914—Refused an offer of $100,000,000 from German agents to refuse to sell ordnance to Great Britain. (His family came from Baden Baden, Germany.)

1916 to date—Chairman of board, Bethlehem Steel Corp.

1918—Director-general, Emergency Fleet Corp.

1927-1932—President, American Iron and Steel Institute.

1928—Awarded Bessemer Medal by Iron and Steel Institute of Great Britain.

1939—Elected by sales executives of New York City as the greatest salesman in America's history.

1939—Died, aged 77, at 290 Park Avenue, New York City, of coronary thrombosis.

ANOTHER photograph of Mr. Schwab in the prime of middle age—taken about the time of the World War.

demanded his winnings. Shortly after, the loser complained: "Surely, Charlie, you don't expect me to go home this way." Mr. Schwab answered, "Sure I do," and the unlucky loser headed up the alleyway for his home six blocks away, followed by two policemen called by the steel master.

Bearish Only Once

Meanwhile Mr. Schwab was becoming as famous for his expressions of faith in the country's business future as for the stories which frequently highlighted meetings of the American Iron and Steel Institute, which he headed from 1927 through 1932. When he finally issued a pessimistic statement in 1936, the event was worth page one attention in many American newspapers. He said:

"From all I can hear, conditions are very bad in New York City. If the Stock Exchange figures have any bearing, it would seem that business over the whole country is at a standstill." Not long after, Mr. Schwab told Bethlehem Steel stockholders that "business was better."

In his later years Mr. Schwab said the obstacles facing the business men of the nineteen thirties were greater than any he himself had to overcome. He described himself as a dreamer, a "sentimental man in business or in anything else." No business will be happy and successful unless it has sentiment in it, he said. Men do their best work under the stimulus of appreciation. I've been smart in picking men and encouraging them, he added.

In 1931 at Youngstown, Mr. Schwab described Mr. Grace, president of Bethlehem and one of Schwab's selections, as "the best business man in America." He told newspapermen that "Grace is worth a million dollars a year." Then and later Mr. Schwab strongly defended the bonus plan under which managers of his company were paid. "It was the plan of Andrew Carnegie, the greatest steel man that ever lived, and it is a good plan," the Bethlehem chairman said.

"Black Beauty" is the Best

Whether Schwab himself was not as great a steel man as Carnegie apparently remains an issue for historians to decide. Yet power, wealth and the usual elements of greatness seemed less important to Mr. Schwab in his later years, and his longing for scenes of his boyhood grew. He paved the road from Loretto to Cresson at his own expense. He built a convent in Cresson and in Loretto and churches in Braddock. He erected a school in Homestead and endowed St. Francis College with $2,000,000. And in an interview in the library of his Riverside Drive home, surrounded by fine editions of famous books, Mr. Schwab pulled out a copy of "Black Beauty." "Here is one of the finest books ever written," he said.

to increase. He became interested in many activities outside the steel industry and developed such a reputation as a teller of stories that his steel friends often told each other, "Charlie could have been an actor."

As actor or steel maker, Mr. Schwab frequently professed not to have a very good opinion of himself. "Here I am," he once said, "a not overgood business man, a second-rate engineer. I can make poor mechanical drawings. I play the piano after a fashion. In fact, I am one of those proverbial Jacks of all trades who are usually failures. Why I am not, I can't tell you." This question he frequently tried to answer. Once he explained: Luck, opportunity, chance —call it what you will—there is certainly something that gives some men more than an even break."

Not all Mr. Schwab's friends were given "an even break," according to his own story of a billiard game in which he risked his trousers. "I'll bet my trousers against yours that I'll beat you," Mr. Schwab said suddenly to his opponent. Mr. Schwab won and

U. S. Merchant Ships Able to Handle All Cargoes for Neutrals

WASHINGTON — With Congress back in session this week to consider the Administration's proposal to repeal the existing neutrality law, Government experts in close touch with foreign shipping express belief that if Congressional action permits the sale of all commodities to belligerents on a cash-and-carry basis the American Merchant Marine is in a position to adequately take care of any increased volume of exports going to neutral countries.

Whereas superficially the volume of exports for example to South America might be expected to tax American vessels, it is pointed out that ships normally carrying cargo to European countries probably will be withdrawn, with the result that a surplus of vessels will be available for shipment of commodities to South American and Asiatic countries remaining neutral. The result merely may be a reallocation of tonnages carried so that American ships are expected to have little difficulty in carrying increased exports.

Situation Better Than in 1914

The position of the merchant marine today compared with 1914 is considerably improved, Government officials point out. At that time this country operated in its regular foreign trade less than 100 ships of about 500,000 gross tons capacity. Today more than three times that number of ships carrying four times that volume of tonnage are in operation. Figures compiled by the Commerce Department's Bureau of Navigation indicate that for the 20-year period prior to the World War, this country carried less than 10 per cent of its foreign water-borne commerce. In June this year, American-operated ships were carrying three times that amount.

Trends in... STEEL MILL EQUIPMENT

By JOHN L. YOUNG
Manager, Machinery Sales Division, United Engineering & Foundry Co.

o o o

THE mere fact that a thing has been done a certain way does not necessarily mean that it must always be done that way. Rather, it quite often suggests the possibility of doing it differently—and better. Such is the by-word of the rolling and processing industry of ferrous and nonferrous metals, guided in part by the equipment builders. And, such is the life blood of these builders.

The development of the backed-up mill has reached a fine point, but the ultimate has not yet been attained. However, a few more months may and probably will bring forth something entirely new both in principle and results.

The processing and finishing of the products of these mills is still in the development stage, especially as to speed and accuracy of shearing and the production of longer and more uniform coils.

A tin plate shear of the rotary synchronized drum type using an adjustable variable crank motion to drive the drums has now been developed. Two units now are in daily operation at speeds close to 800 ft. per min. Even at this high speed, the required accuracy of plus or minus 1/64 in. is being maintained.

The merchant, billet, bar, rod, and shape mills of this country have shown little advance in the last 10 or 15 years, except in a few isolated cases. The further development of that phase of rolling is under surveillance now and studies are being made toward the end of improvement from the standpoints of production and quality. It holds promise of being the next major undertaking as far as the rolling mill proper is concerned.

The field of roll neck bearing study has not yet reached an end. Two new designs are in the offing, one a spherical flood lubricated sleeve bearing, and the other a highly developed sealed chock mounted fibre bearing. Several installations of the latter have been made on both 2-high and 4-high hot and cold mills with surprising results. Several additional installations are now under way. Circulating water with a small percentage of oil serves as the lubricant.

This type of bearing can run directly on the roll neck and thereby allow a larger diameter of neck in proportion to the roll body diameter than other highly developed bearings of the sleeve type. The original installation cost is relatively low and indications seem to point to a low maintenance cost.

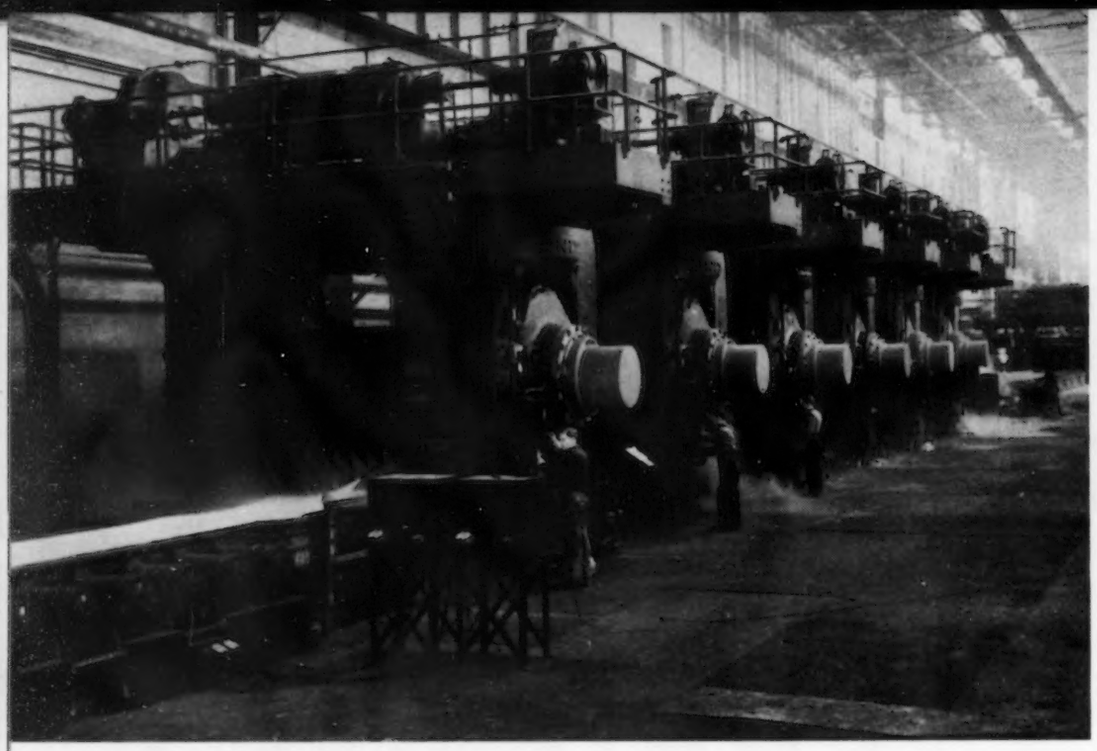
Welding in its varied forms has really just started, especially as applied to non-ferrous and stainless steels. The welding of aluminum, duralumin, copper, and brass has progressed to a point of application instead of experimentation.

The welding of ferrous strip into coils has been referred to by the writer in previous papers. Both gas and electric welders have been installed, with the percentage in favor of the electric butt weld where the time cycle is all essential, such as in the continuous pickle line.

Two recent installations of electric butt flash welders have proved that statements made previously as to a time delay under 2 min. for shearing, welding, flash trimming, and side clipping have now become a fact.

The principle of alining the ends of the leading and trailing coils in the welding dies before clamping, shearing, and welding has been applied to this new unit. This unit was designed as a strip-coil welding machine rather than a modified flash welder to be installed in a continuous pickling line. Requirements of such a machine are that it must handle wide and narrow strip both in thin and thick gages.

Assuming that the continuous pickler has been threaded, the leading



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"THE field of roll neck bearing study has not yet reached an end. Two new designs are in the offing, one a spherical flood lubricated sleeve bearing and the other a highly developed sealed chock mounted fiber bearing."

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coil is run into the pit ahead of the pickling tanks and the back end of the strip is cropped by an upcut shear and then moved forward to the end shearing and welding position, centered by air operated dogs, and clamped in the front welding clamp. The front end of the trailing coil is then run through the uncoiler and cropped in the upcut shear and centered and clamped in the rear welding clamp.

A rotary shear unit is then run between the front and rear welding clamps, which are spaced 24 in. apart, and both ends are sheared and matched simultaneously.

This rotary end shear unit is moved across the welder by an overhead motor-driven screw and remains in its position clear of the welder and on one side of the welder until the next end shearing operation is required, when it is moved back to its original starting position.

The welder clamps are then brought up to the welding position by hydraulic cylinders and the welding cycle started. In the meantime, a hydraulic gripper has been moved up to the delivery side of the welder immediately following the front clamp and the strip is gripped ready for the flash trimming operation following the completion of the weld.

As soon as the burn-off and push-up welding cycle has been completed, the welding clamps automatically release and the hydraulic gripper automatically pulls the weld through a V-shaped plow type stripping knife which strips the weld flash from both top and bottom surfaces of the strip at the same time.

At the end of the gripper stroke, the weld is automatically placed in position for the side clippers, one on each side of the weld, so that the extremities of the weld are clipped out. The pinch rolls on the delivery side of the welder then deliver the strip into the pit ahead of the pickling tanks.

The weld is made on a slight skew so that the necessity of precision stripping is reduced, and so that no perceptible bump occurs when the weld goes through the cold mill.

The strip coil welder is designed with a minimum number of adjustments required throughout the normal range of its operation, in order to avoid both the time consumed by the adjustments and the possibility of error in making those adjustments.

The 24-in. opening between the welding dies makes the dies readily accessible for maintenance. The top half of each clamp is articulated in order to give uniform pressure on narrow or wide strip without further adjustment.

Two sets of self-centering side guides or dogs are installed before and after the two welding clamps so that the centerline of the strip is maintained before the clamping and welding operation.

The automatic electric welder just described is designed principally for large tonnages. For the small tonnage plant, or even for the large tonnage plant where the welder is separated from the continuous pickler, a strip coil welding jig has been developed.

Manual gas welding is used and good rollable welds are obtained. This unit consists principally of two coil holders with an elevated clamp and welding device between the two coil holders.

If two coils are to be joined together, those two coils will have their ends sheared square at the delivery end of the pickle line, and one coil placed in each of the coil holders. The ends are then placed manually in the elevated clamp and are then matched and welded.

After welding ,the motor driven cradle rolls coil the first and second coils together on one side of the machine. If three or more coils are to be joined together to make a longer strip, additional coils can then be placed in the cradle on the entry side of the machine and the process continued.

This welding jig is a low cost modification of the automatic gas welder, which consists of a retractable upcut shear with multiple tip gas torches working on both top and bottom of the seam at the same time.

In this more elaborate automatic gas unit the two ends of the coils are brought up and sheared while being held in clamps. The shear is then retracted and the torches traverse the seam, making the side weld. Rolls may be attached to follow the torches to flatten the weld where finished stock is being handled. No stripping of the weld is required. This welder is suitable for recoiling lines with a promise of short enough time cycle in the future for pickling lines.

ASSOCIATION OF IRON AND STEEL ENGINEERS

(ORGANIZED 1907 AS ASSOCIATION OF IRON AND STEEL ELECTRICAL ENGINEERS)

EMPIRE BUILDING · PITTSBURGH

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1939

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TO READERS OF THE IRON AGE:

It is, indeed, a pleasure for the Association of Iron and Steel Engineers to extend a cordial invitation to those active in and associated with the iron and steel industry, to attend the 35th Annual Convention and Iron and Steel Exposition to be held at the William Penn Hotel in Pittsburgh, Pennsylvania, September 26th to 29th inclusive.

The brightening outlook for business generally has brought about a renewed and more vigorous interest on the part of executives, engineers and operators alike, in those new ideas and new methods which are so vital to progress in the steel industry. This is strongly reflected in the Iron and Steel Exposition which will be more comprehensive and promises to be a greater inspiration than ever before.

In selection of the subject material of papers and the authors who will present them, the program committee of the Association has exercised every precaution to make sure that each subject is not only timely but that it is presented authoritatively.

The value of opportunities afforded by attendance at this Convention to renew old acquaintances and to make new ones among those whose daily problems are the same as our own, and to exchange experiences and ideas with them, cannot be overestimated.

We are glad to extend this invitation. Be there! You will return to your daily tasks filled with renewed courage and enthusiasm which is so necessary in these trying days.

Yours very truly,

C. Clarke Wales

C. Clarke Wales,
President
A. I. & S. E.

CCW:mtw

C. CLARKE WALES
President, Association of Iron and Steel Engineers.

STEEL ENGINEERS MEET NEXT

COMING as it does in the midst of a general domestic upswing in the iron and steel business and with the strong possibility of additional increases in export demand, the 35th annual convention and exposition of the Association of Iron and Steel Engineers, to be held in the William Penn Hotel, Pittsburgh, Sept. 26 through 29, inclusive, is expected to draw even more than the 5000 steel mill executives and operating engineers originally anticipated.

With practically all steel companies concentrating on cost reduction because of keen competition and a relatively high tax burden, the papers by leading authorities on steel plant design and operation are expected to be well received. A broadened and amplified program, consisting of 25 technical papers covering virtually every phase of the production of steel, is to be provided.

The iron and steel exposition, which will also be at the William Penn Hotel, will include exhibits of the latest design and products of over 100 manufacturers of steel mill equipment. The entire 17th floor, the Chatterbox, and the Italian Terrace of the hotel will be utilized for the exposition, which will be in close proximity to the meeting rooms where the technical sessions will be held.

Those attending the convention will have the opportunity of making two inspection trips, one on Sept. 27 to Carnegie-Illinois Steel Corp.'s Irvin Works, and one on Sept. 29 to Carnegie's Edgar Thomson Works. The visit to the Irvin works will include the recently installed 80-in. hot and cold strip mills, while the trip to Edgar Thomson works will afford opportunity to inspect a recently installed slabbing mill, as well as other operating equipment.

Benjamin F. Fairless, president, United States Steel Corp., is to be principal speaker at the association's formal banquet and dance Thursday evening, Sept. 28. Also included on this program will be a short talk by Strickland Gillilan, noted author and commentator.

Tuesday, Sept. 26

Iron and Steel Exposition, 9.00 a.m. to 10.00 p.m.

Registration, Main Lobby, 9.00 a.m.

Ladies' Registration, Room 1075, 9.00 a.m.

BUSINESS SESSION
(9.15 a.m., Forum Room, 17th Floor)

ELECTRICAL ENGINEERING DIVISION
(9.30 a.m., Forum Room, 17th Floor)

"A Double Bus System for Power Transmission," by D. I. Bohn, electrical engineer, Aluminum Co. of America, Pittsburgh, and J. E. Housley, superintendent of power, Aluminum Co. of America, Alcoa, Tenn.

"Vacuum Tube Control for Steel Mill Applications," by H. L. Palmer, electronic section, and H. W. Poole, steel mill section, General Electric Co., Schenectady, N. Y.

"The Transition from 25 to 60 Cycle Power in the Steel Industry," by W. B. Skinkle, secretary and engineer, Pittsburgh District Power Committee, United

FRANK E. FLYNN
District manager, Republic Steel Corp., Warren, Ohio, and treasurer, Association of Iron and Steel Engineers.

ASSEMBLE

WEEK

JULIUS A. CLAUSS
Chief engineer, Great Lakes Steel Corp., Ecorse, Mich., and first vice-president, Association of Iron and Steel Engineers

States Steel Corp. Subsidiary Companies, Pittsburgh.

MECHANICAL ENGINEERING DIVISION

(1.30 p.m., Forum Room, 17th Floor)

"Economics of Advanced Engineering Planning," by A. R. Schulze, chief engineer, Carnegie-Illinois Steel Corp., Youngstown.

"Modernization of Existing Open-Hearth Furnaces and Auxiliary Equipment," by G. L. Danforth, Jr., Open Hearth Combustion Co., Chicago.

"Developments in Rolling Flat Steel Products—1939," by Stephen Badlam, consulting engineer, Pittsburgh.

J. L. MILLER
Chief combustion engineer, Republic Steel Corp., Cleveland, and secretary, Association of Iron and Steel Engineers.

WELDING ENGINEERING DIVISION

(1.30 p.m., Parlor, Club Floor)

"Stress Relief in Welded Structures," by Dr. J. C. Hodge, chief metallurgist, Babcock & Wilcox Co., Barberton, Ohio.

"Welding of Rail Ends and Joints of Crane Runways," by Wray Dudley, assistant superintendent of maintenance, National Tube Co., McKeesport, Pa.

"Welding Electrodes and Their Applications," by J. H. Deppeler, chief engineer, Metal & Thermit Corp., New York.

"Automatic Atomic Hydrogen Welding of Steel," by J. T. Catlett, General Electric Co., Schenectady, N. Y.

Exhibitors' Dance, Informal, Cardinal Room, 17th Floor, 10.00 p.m.

Wednesday, Sept. 27

Iron and Steel Exposition, 9.00 a.m. to 10.00 p.m.

OPERATING PRACTICE DIVISION

(9.00 a.m., Cardinal Room, 17th Floor)

Symposium on the Preparation of Steel for Subsequent Rolling:

"Preparation of Semi-finished Steel," by A. P. Spooner, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.

"Mechanical Billet Clipping," by G. W. Lentz, chief engineer, Bonnot Co., Canton, Ohio.

"Steel Conditioning with the Oxy-acetylene Method," by G. D. Winlack, Air Reduction Sales Co., New York.

"Billet Grinding," by A. Rousseau, Norton Co., Worcester, Mass.

Ladies' Sightseeing Trip: H. J. Heinz Co., Cathedral of Learning, Foster Memorial, Heinz Chapel, 11.30 a.m.

Inspection Trip: 80-in. hot and cold strip mills, Irvin Works, Carnegie-Illinois Steel Corp., Dravosburg, Pa., 12.45 p.m.

Thursday, Sept. 28

Iron and Steel Exposition, 9.00 a.m. to 5.30 p.m.

ELECTRICAL ENGINEERING DIVISION

(9.00 a.m., Cardinal Room, 17th Floor)

"Gage Control for Cold Strip Mills," by F. Mohler, electrical engineer steel mill section, General Electric Co., Schenectady, N. Y.

"Power Requirements of Cold Strip Mills," by A. F. Kenyon, steel mill engineer, industrial department, Westinghouse Electric & Mfg. Co., East Pittsburgh.

"Development in Electrical Truck Transportation in Continuous Sheet and Strip Mills," by C. B. Crockett, Industrial Truck Statistical Association, Chicago.

COMBUSTION ENGINEERING DIVISION

(9.00 a.m., Forum Room, 17th Floor)

"Types and Selection of Refractories for the Steel Plant," by J. S. McDowell and J. P. Bankson, Harbison-Walker Refractories Co., Pittsburgh.

"Observations on the Heating of Steels from the Metallurgical Viewpoint," by E. E. Callinan, combustion engineer, and Gilbert Soler, director of research, steel and tube division, Timken Roller Bearing Co., Canton, Ohio.

"Modern Gas-Mixing Systems as Applied to Steel Plant Requirements," by G. M. Arnold, industrial division, Cutler-Hammer, Inc., Chicago.

OPERATING PRACTICE DIVISION

(1.30 p.m., Forum Room, 17th Floor)

"Yields of Coke and By-Products from Various Coals," by J. D. Davis, supervising chemist, coal carbonization section, Bureau of Mines, Pittsburgh.

"Reasons for Adopting Certain Details in the Design of the New Inland Blast Furnace," by Hjalmar W. Johnson, superintendent of blast furnaces, Inland Steel Co., Indiana Harbor, Ind.

"Reconstructed Blast Furnace Shell of Welded Design," by L. J. Gould, assistant chief engineer of construction, Bethlehem Steel Co., Bethlehem, Pa.

LUBRICATION ENGINEERING DIVISION

(1.30 p.m., Cardinal Room, 17th Floor)

"Modern Lubrication of Existing Equipment," by F. J. Thomas, lubrication engineer, Republic Steel Corp., Cleveland.

"Progress of Lubrication in the Steel Mills," by C. C. Pecu, lubrication engineer, Bethlehem Steel Co., Lackawanna, N. Y.

"Causes of Gear Wear and Failure," by J. H. Jones, metallurgist, Republic Steel Corp., Massillon, Ohio.

FORMAL BANQUET AND DANCE

Banquet: Main Lobby, 7.00 p.m. Speakers: B. F. Fairless, president, United States Steel Corp., Pittsburgh; Strickland Gillilan. Dance, Cardinal Room, 17th Floor.

Friday, Sept. 29

Iron and Steel Exposition, 10.00 a.m. to 3.00 p.m.

Inspection Trip: Edgar Thomson Works, Carnegie-Illinois Steel Corp., Braddock, Pa., 9.00 a.m.

WILLIAM A. PERRY

Superintendent, electrical and power departments, Inland Steel Co., Indiana Harbor, Ind., and chairman, Electrical Engineering Division.

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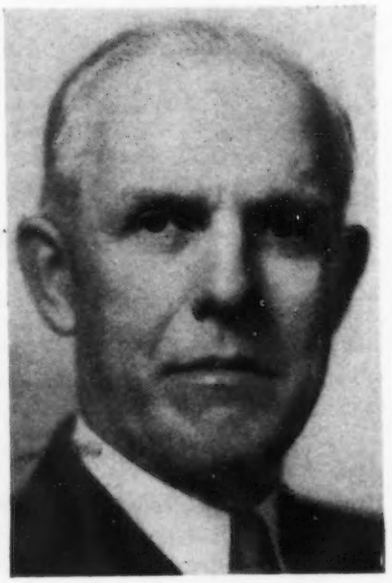

JOHN LESTER PERRY

President, Carnegie-Illinois Steel Corp., and official host on Iron and Steel Engineers' inspection trips to Carnegie-Illinois Steel Corp.'s Irvin and Edgar Thomson Works.

List of Exhibitors

Alliance Machine Co., Allis-Chalmers Mfg. Co., Aluminum Co. of America, American Brake Shoe & Foundry Co., American Car & Foundry Co., American Manganese Steel Co., Amsler-Morton Co., Askania Regulator Co., Automatic Transportation Co., Bailey Meter Co., Baker-Raulang Co., Bantam Bearings Corp., Bearing Service Co., Benjamin Electric Mfg. Co., Blaw-Knox Co., Bristol Co., Charles Bruning Co., Inc., Bussmann Mfg. Co., A. W. Cadman Mfg. Co., Clark Controller Co., Cleveland Crane & Engineering Co., Cleveland Worm & Gear Co., Colt's Patent Fire Arms Mfg. Co., Columbus McKinnon Chain Corp., Crocker-Wheeler Electric Mfg. Co., Crouse-Hinds Co., Cuno Engineering Corp., Cutler-Hammer, Inc., DeLaval Separator Co., Joseph Dixon Crucible Co., Edison Storage Battery Division of Thomas A. Edison, Inc., Electric Controller & Mfg. Co., Electric Storage Battery Co., Electrical Engineers Equipment Co., Elwell-Parker Electric Co., Farrel-Birmingham Co., Inc., Farval Corp., Garlock Packing Co., Gatke Corp., General Electric Co., General Electric Vapor Lamp Co., Graybar Electric Co., Inc., Hagan Corp., Heppenstall Co., Holophane Co., Inc., Homestead Valve Mfg. Co., Inc., Hyatt Bearings Division General Motors Sales Corp., Ideal Commutator Dresser Co., *Industrial Heating*, THE IRON AGE, *Iron and Steel Engineer*, I-T-E Circuit Breaker Co., Jefferson Electric Co., Johns-Manville, Keystone Lubricating Co., Le Carbone Co., Inc., Link-Belt Co., Martindale Electric Co., Mesta Machine Co., *Metals and Alloys*, Miller Co., Morgan Construction Co., Morgan Engineering Co., Morganite Brush Co., Inc., National Bearing Metals Corp., National Carbon Co., Inc., National Electric Coil Co., Norma-Hoffmann Bearings Corp., Otis Elevator Co., Pennsylvania Electric Coil Corp., Penton Publishing Co., Philco Radio & Television Corp., Poole Foundry & Machine Co., Post-Glover Electric Co., Pyle-National Co., Railway and Industrial Engineering Co., Ready-Power Co., Reliance Electric & Engineering Co., Republic Flow Meters Co., H. Lee Reynolds, Rockbestos Products Corp., Rollway Bearing Co., Inc., Joseph T. Ryerson & Son, Inc., SKF Industries, Inc., Socony-Vacuum Oil Co., Inc., Steel Publications, Inc., Stewart-Warner Corp., Texas Co., Thompson Electric Co., Timken Roller Bearing Co., Tool Steel Gear & Pinion Co., Trumbull Electric Mfg. Co., United Engineering & Foundry Co., Wagner Electric Corp., Westinghouse Electric & Mfg. Co., Edwin L. Wiegand Co., Yale & Towne Mfg. Co.

Job Rating

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By EUGENE CALDWELL
Consulting Management Engineer, Milwaukee, Wis.

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THE possibilities of job rating surveys are very attractive, although many plants which never have attempted personnel control do not realize this. This article discusses the working and advantages of such surveys. Last week, the author considered uses of job rating, checking of specifications, number of jobs, etc. In this, the final section of a two-part article, there is included discussions on wage rate bands, wage adjustments, promotions, influence of improvement in equipment, etc.

BEFORE attempting to make any adjustments to or comparisons between wage rates for different men in the plant, the factors used in the rating system should be analyzed to determine if by personal opinion the wage rates should be governed by these items. Perhaps there are some more important factors not included which should affect the rates.

The factors used by the National Electrical Manufacturers' Association have already been outlined. There is no scientific way of establishing ratings for these factors. At best the relative ratings given are arbitrary and matters of opinion. Group judgment in such cases is superior to individual judgment.

The necessity of everyone concerned being sold on the rating schedule as a basis of setting rates cannot be overemphasized. Unless the fundamental set-up can be agreed upon, there is little use of proceeding further with job evaluation.

Checking Rates With Normal

After all jobs are analyzed and the men filling each of the jobs determined with their present rates, a chart can be made up whereby existing wage rates are plotted against the rating numbers for each job. In this way it can be determined if there is any consistency between the ratings given the several jobs and existing hourly rates.

Since it has previously been determined that the factors decided upon in the rating scale are the ones which should influence wages, it is obvious that a straight line can be drawn on the chart, ascending as the ratings become higher, which will represent the theoretically perfect rate for any particular job.

This straight line should be established by what the mathematician knows as the "method of least squares." Although a rather laborious calculation, it is a very simple one. Attempts should not be made to establish such an important line on the chart by inspection.

Then a comparison can be made between the perfect rate and the actual rate being paid each individual filling the particular job. It is fairly well accepted that hourly wage rates should reflect only the ability of a particular worker to earn profits for the company in a particular job. They should not reflect such things as length of service with the company except insofar as the ability to perform the particular job has increased. Neither should they reflect personality, unless that has some bearing on the particular work to be performed, for example, in work where the employee must meet the public.

Length of service is certainly a factor for which to award an employee, thus creating an incentive for remaining with the company and, in turn, reducing the heavy expense of rapid labor turnover. Pride in one's job and the company one has worked for for many years is something that should be encouraged. However, length of service can better be compensated for by means of bonuses than by adjusting wage rates above the rate merited by the particular service performed in a given job.

The usual case is that employees will be found on both sides of the perfect rate. Some are too high and some are too low.

In using a chart of this nature it should be borne in mind that the so-called perfect rate indicates a rate for that job only in relation to all the other jobs in the plant. In other words, it may be that all of the rates in the plant are too low, in which case the entire curve should be raised. On the other hand, the rates may all be too high in comparison with the local market or competition. Nevertheless, the chart will show what is consistent in comparison with the factors decided upon in the rating set-up.

If a chart is available for the entire district made up by rating other plants under the same system, the line for a particular plant may be of a different slope or it may be parallel but above or below the line. A different slope than the district means the particular plant places a different degree of importance upon the higher job ratings than the average for the district—either too great or too little, as compared with the district depending upon whether the line rises more rapidly or less rapidly than the district.

A parallel line shows the recognition of the grading of jobs, as reflected in rates to be the same as that of the district, but the entire wage level of the plant in question may be too high or too low as judged by the average of the district.

Wage Rate Bands

It is hardly practical to have a single hourly rate for each man on a

particular job, because abilities and experience vary. Most concerns find it desirable to set up a band for each job or a range of rates above and below the perfect rate constituting a high and low limit for the job.

The idea would be that a man's hourly rate when working on a particular job would have to fall between these high and low limits. When the man was first employed, he would start in at the low rate. As his experience and abilities increased, he would progress to the high rate but could never go beyond this rate while still on that particular job. A particular man's remaining at the top figure for any considerable length of time would indicate that he should be promoted to the next ranking job as soon as a vacancy occurred, where his rate could increase still further. Obviously, the rate bands overlap each other.

Just how wide these hourly rate bands should be is a question for decision in each company. The Leeds & Northrup Co., Philadelphia, where job rating has been in use for many years, has a range of about 10c. A suggestion would be to have a variation of 4c. above and below the perfect rate. This would give a range of 9c. for each job.

". . . length of service is certainly a factor for which to reward an employee, thus creating an incentive for remaining with the company and in turn reducing the heavy expense of rapid labor turnover . . . but, length of service is best compensated for by means of bonuses rather than by adjusting wage rates." Robert Yarnall Richie photo.

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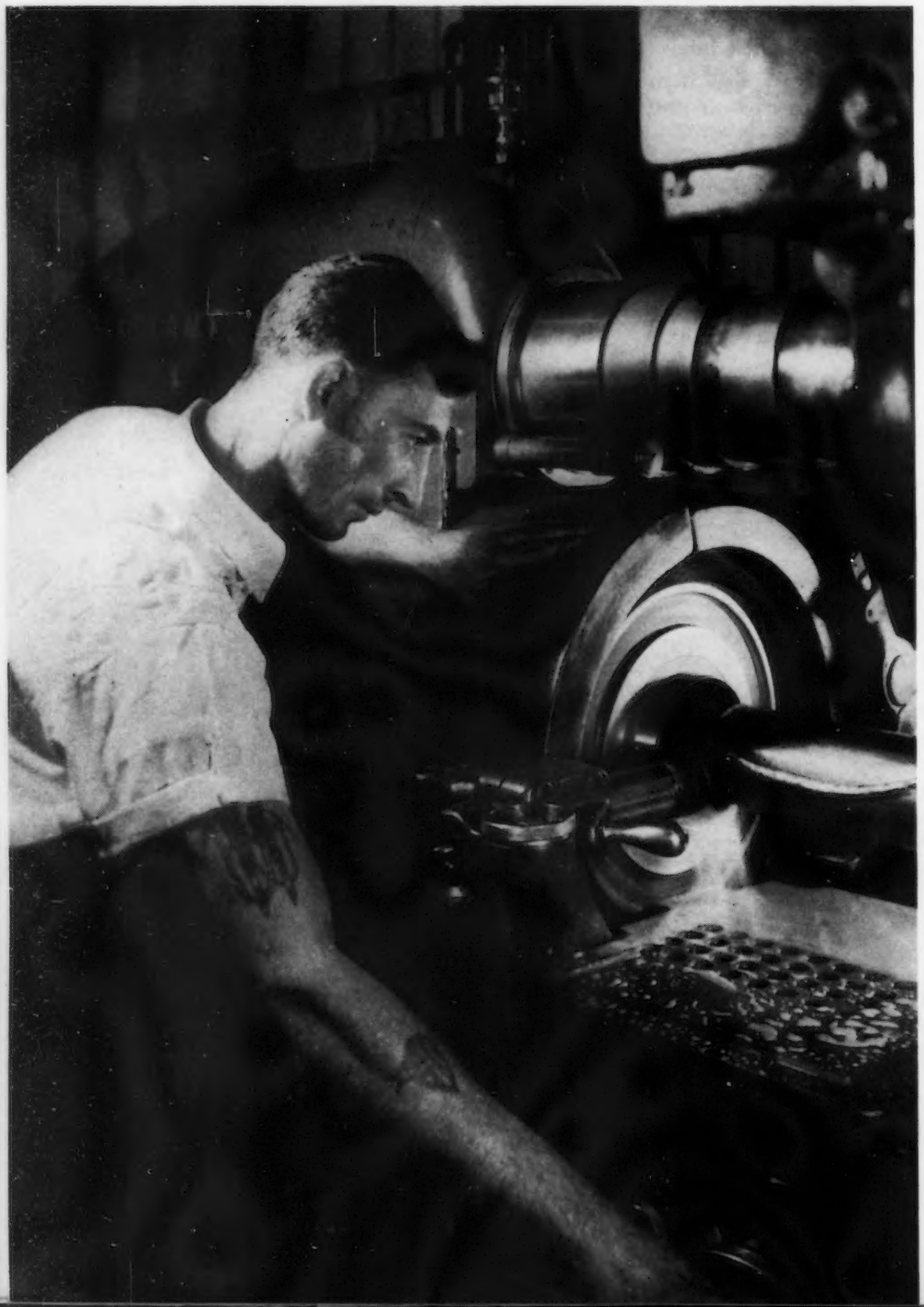

As previously explained, it is not contended that a plant can be so mechanized that no skilled labor whatever will be required. However, the job ratings indicate the direction for improvements to work toward.

This idea of having a range for each job into which compensation must fall has been in use in connection with salaries by the Westinghouse Electric & Mfg. Co. for many years. Their set-up runs clear up to the president.

Wage Adjustments

If the wage bands for each job are to be put into effect as suggested in the previous section, consideration has to be given to increasing the hourly rates of employees whose present rate is below the bottom limit and decreasing the hourly rate for those whose present rate is above the maximum limit. This is a question that gave most of the audience at the recent Personnel Conference, in Chicago, the greatest concern. It is easy to raise those rates which are lower than the lowest limit of the band, but under present labor conditions, how are any rates going to be lowered in order to get those above the limit into the allowable range?

Unfortunately, Leeds & Northrup's experience could not be of much assistance in the problem because that company put its job rating system into effect many years ago, and since then the jobs have been gone over and rerated every six months. Consequently, no rates get very far out of line.

Nevertheless, a company putting in job rating for the first time is almost sure to find a number of rates above the top allowable limit. If it is felt that these rates cannot be lowered under present conditions, one solution would be to raise the low rates and allow the high rates to stand until such time as they can be brought in line by promotions, change in personnel, or by general increases. In other words, when general increases are given the high rates are left where they are until after three or four years the entire wage band comes up to the point where the high rate in question is inside the band. Consequently the wage bands in a few cases become an ideal to work towards.

Substitution of Job Rates

Further consideration should be given to the elimination entirely of hourly rates for employees and a substitution thereof of rates on particular

jobs. Under this plan a man might work one-half day on one job and the remainder of the day on another job, for which he would be paid the actual rate on each job for the time involved.

This would, of course, involve accurately keeping track of the time spent on each job. As a matter of fact this arrangement is exactly what is provided for in some arrangements with employees whereby a man gets the rate for the particular job when he goes on different work.

This plan is perhaps theoretically good, but perhaps is not very practical. In cases where a man is asked to help out on a lower rated job in case of an emergency or rushed condition, it may not be fair to require him to lower his hourly rate, particularly in cases where there is plenty of his own work to be done.

Abilities of Men

A careful analysis should be made of each man to determine if he has all of the qualifications set down for the job he is now occupying. In case any of the qualifications are lacking, attempts should be made to place the man in other work better suited to his education and abilities.

Promotions

A careful analysis should be made of the sequence in which the jobs are placed based on the ratings given. Is it felt that the job given the lowest rating in the schedule is the place where a new man could most easily be started in.

Of course, there are boundary lines which cannot be crossed. For example, it would hardly be possible for a man to advance from the job of electrician to that of toolmaker.

However, personnel policies that have existed in the past in many plants, wherein men have been kept on the same type of work for 30 or 40 years, should be revised. In the opinion of the writer, if a man in this length of time is not capable of advancing to higher grade work, he should not have been hired in the first place.

Many firms have adopted the policy of only hiring new men for work in the shop who have at least a high school education. This serves to raise the level of intelligence of the entire organization. Such men can be kept interested if a regular system of advancement is in effect, and men are brought up through the shop rather than being kept on the same work for years.

This is perhaps the most important phase of a job rating survey. It is easily possible that an improper attitude has been created on the part of many employees in the past because they have felt there is little opportunity for advancement. In many cases there has been no clear cut picture of what jobs represented a promotion over others. Rating schedules have been too loose, an employee getting no increase in hourly rate when he was advanced to other work.

The company is probably largely at fault when a man stays on the same job for 30 or 40 years. He has not been guided or trained into any other work. Of course, there is involved the problem of constantly training men for new work. It is difficult to take a man from work he has become expert at (perhaps having previously eliminated a plant headache) and place him in new work for he must be trained. However, one of the expenses of doing business is training men for the various jobs, and in the writer's opinion it is a duty continuously to run a school in the sense that understudies are trained for the next higher job.

Disclosing Survey to Employees

Careful consideration should be given to whether or not this information is to be disclosed to the employee. Quite likely a large measure of the effectiveness of this work will be lost unless it is brought to the employee's knowledge what has been determined as the specifications or requirements for the job he is now holding.

Merit rating systems, whereby each employee is rated regularly by his foreman and by others who have contact with his work, should certainly the employee into the picture and show him just how he has been rated by the man he is working for. In this way the employee can try to bring up his weak points to a better average.

By disclosing job ratings to the employee he gets a picture of what the management regards as necessary for the job. He must also get the impression of thoroughness of consideration on the part of management of his job and must realize the impartiality of treatment. He, moreover, gets a picture of the next higher job to which he can aspire and work toward. Then if he fails to get promoted or an advance in rate, he has no one but himself to blame.

If the results of the survey are to be disclosed to the employee holding the job in question, careful consideration should be given as to just how this would best be done. Should the employee be given a copy of the specification sheet together with a carefully worded explanation of what it means and what is being attempted by means of the rating system? Would a general meeting of employees be advisable? Is there a still better way?

Overall Picture of Labor

By the preparation of various summaries of the ratings, overall pictures of the kind of labor used in a particular plant can be obtained. For example, maybe no unskilled labor of any kind is required in the plant. Or, perhaps the highest grades of labor are not used, as for example grades one and two.

In a one plant, for instance, an analysis of the various requirements showed the following ranges for the different factors:

	Degrees
Education	1 to 4
Experience	1 to 4
Initiative and ingenuity	1 to 4
Physical demand	1 to 4
Mental and visual effort	2 to 4
Responsibility for equipment	1 to 3
Responsibility for material	1 to 3
Responsibility for safety of others	2 to 5
Responsibility for work of others	1 to 3
Working conditions	2 to 5
Hazards	2 to 5

It may also be serviceable to determine if a lower or higher grade of labor is employed than the averaye for the district. This can be learned by finding the midpoint from the chart of the particular plant, where there are as many points above as below and then the same thing from the chart for the entire district.

New Jobs

Obviously if job rating is to be of any benefit, it must be kept up to date. As new jobs are created, new specifications must be drawn up and new cards made out for the new jobs. It is possible to have this done as a continuous service by an outside agency. In the absence of some outside source of this nature, arrangements should be made to take care of the work within your own organization.

Changed Conditions

As conditions change, such as the installation of new improved machinery eliminating some of the hand labor, making operations more automatic, of course, specifications on a particular job and the rating should be changed

(CONCLUDED ON PAGE 45)

BERYLLIUM—

By LOUIS L. STOTT
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DISCOVERED as an element in 1797, beryllium remained a laboratory product for over 100 years. The metal fascinated many of the leading scientists of the 19th Century, but various attempts to devise commercial means of production ended in failure.

Being approximately one-third lighter than aluminum and yet considerably more rigid than steel, having remarkable resistance to corrosion, and a coefficient of expansion about the same as cast iron, beryllium seemed the ideal light metal.

During early attempts at beryllium production in this country in 1925, research at the Kemet Laboratories in Cleveland was aimed at developing the light metal possibilities of the metal. This work appeared to indicate, however, that commercially prepared beryllium was not sufficiently ductile to be used as a structural metal. Since then the National Physical Institute in England has reported that beryllium of extremely high purity is ductile, *but no one has yet succeeded in producing commercial quantities exhibiting this quality.* If this is ever achieved, a step forward in metallurgy of inestimable value to aviation would be realized.

Shortly after the World War the large German electrical firm, Siemens & Halske, instigated a very complete investigation of beryllium, both as to methods of production and possible alloys. The major results of this research were printed in book form, a translation of which under the title "The Production and Alloys of Beryllium" was printed in this country by the Rheinhold Publishing Co.

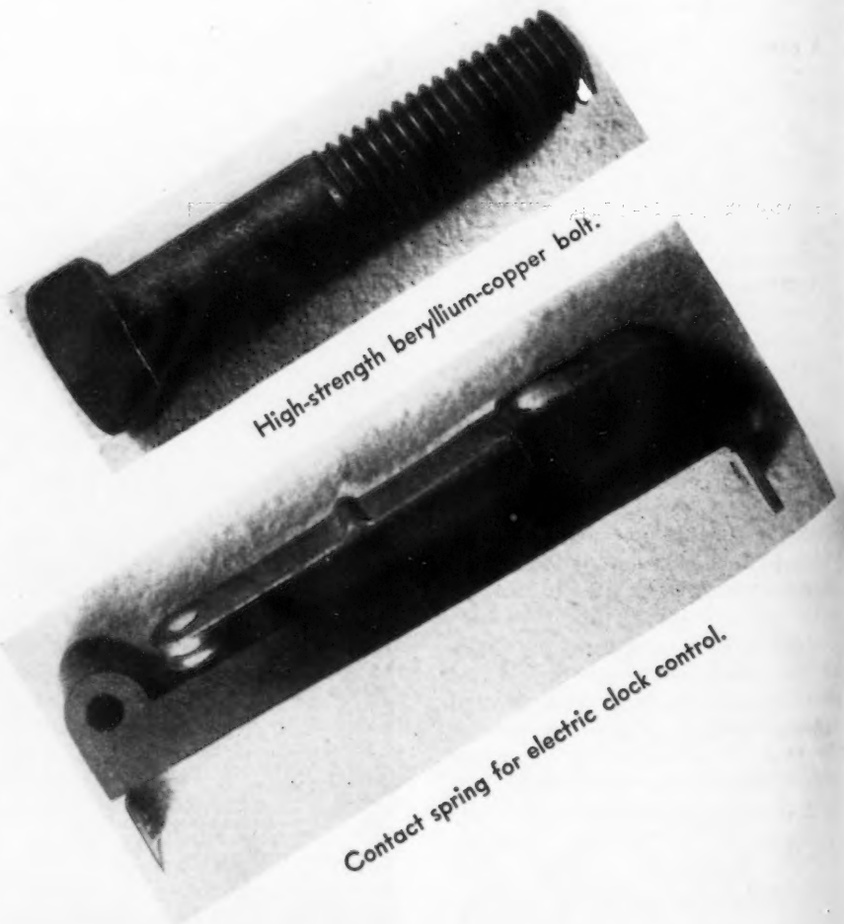
In 1926, during the course of this investigation, the remarkable property of beryllium in imparting heat treatable characteristics to copper, nickel, cobalt and iron was discovered. It is this characteristic which has brought the element into commercial importance over the last few years.

Beryllium-Copper Alloys

Beryllium is the most effective hardening agent for copper known to metallurgy. An addition of only 2¼ per cent beryllium enables obtaining by heat treatment a strength more than six times higher than soft copper. This enormous increase in strength is accomplished with less sacrifice of electrical conductivity than when other hardening agents such as silicon or tin are used.

The trend in modern machine design is toward greater compactness. Design engineers are continually striving to save space. Moreover, higher and higher speeds are being demanded in reciprocating parts. Smaller sections and higher speeds mean greater stresses.

It is here that beryllium-copper alloys are particularly important. The material usually used for current carrying springs in electrical apparatus is phosphor-bronze, an alloy of copper



A Versatile Element

BERYLLIUM has been much in the news lately, and has acquired the glamour of a wonder metal. What is its true sphere of influence in today's metallurgy? The author answers this question with the authority of many years of experience with the metal beryllium and the growing number of beryllium alloys.

and tin which has been deoxidized with small amounts of phosphorus. Not only does 2 to 2¼ per cent beryllium-copper have at least 75 per cent better electrical conductivity than this bronze, but it can be stressed 50 per cent higher without taking a set.

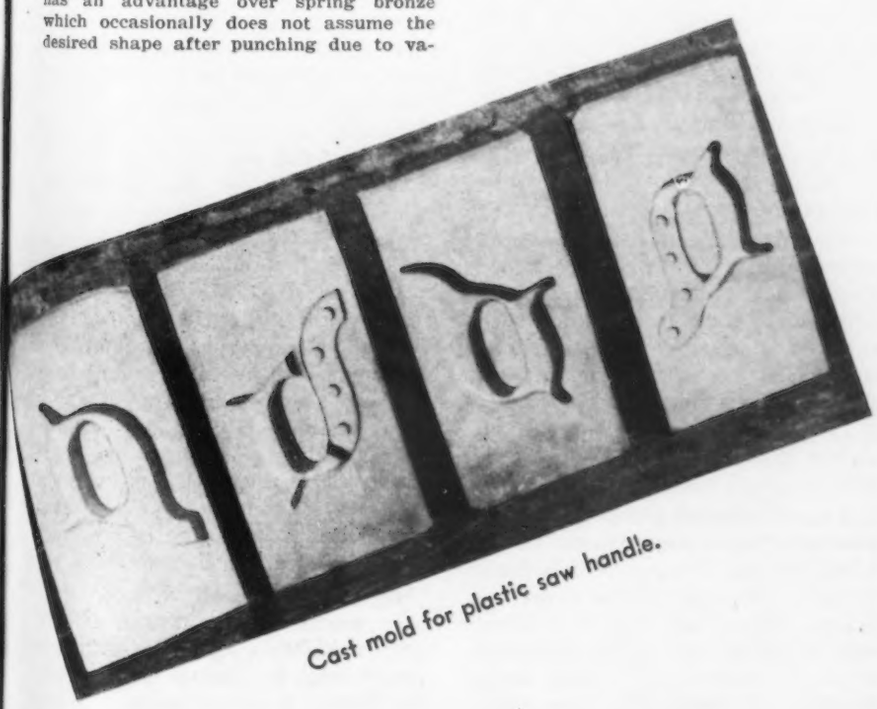
Because of these properties, there is a growing use of beryllium-copper for springs of all kinds in electrical devices, control instruments, aviation instruments, telephone equipment, etc.

Besides the high strength and electrical conductivity, there are two other important advantages of these alloys, ease of forming and elastic stability. The benefits derived from forming parts in a soft temper and then heat treating to obtain spring properties are well explained by a statement made by a prominent manufacturer of aviation magnetos, as follows:

"As to our reasons for using beryllium-copper for these parts instead of bronze:

"We find that beryllium-copper is readily punched and formed in its soft state. It can be formed to a desired shape readily and retains its shape. It, therefore, has an advantage over spring bronze which occasionally does not assume the desired shape after punching due to variations in the hardness of the material from that for which the die was designed.

"After punching, the beryllium-copper is given a simple, one stage heat treatment. After this treatment, it is only slightly inferior to heat treated steel spring material and does not soften with fatigue as does bronze. For our purposes, it is superior to steel because its electrical conductivity is about three times that of steel. In other words, we use it for springs which carry electric current of low values where good conductivity is desired."



Cast mold for plastic saw handle.

The stability of beryllium-copper as a spring material is shown in its freedom from elastic defects in such parts as the diaphragms of aviation altimeters and in the bourdon springs of pressure gages, in both of which applications accuracy and stability of spring properties are essential. It is admitted by manufacturers of such devices that beryllium-copper has less drift or elastic hysteresis than any other corrosion-resisting material commercially available.

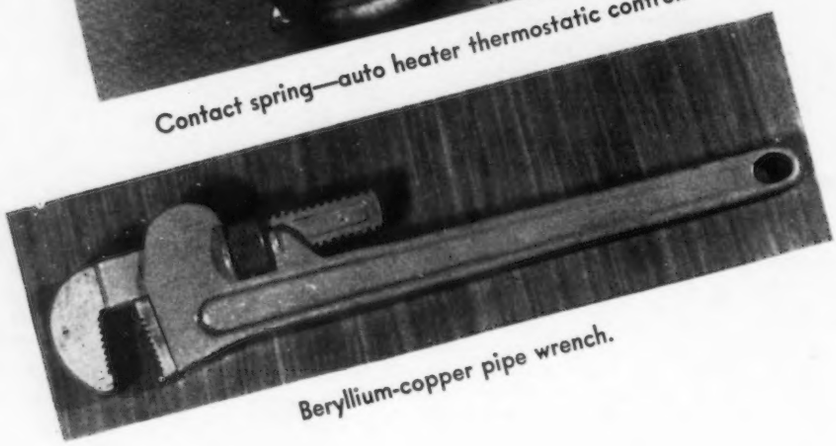
Beryllium-copper is also being used with success for frictional or wear-resisting parts, such as bushings, cams, sleeves, rollers, etc. One of the aviation motor companies reports the successful application of the alloy to tappet roller bushings at bearing pressures of 9000 lb. per sq. in. Another firm in the same field has found the material superior to any other for spacing shims between steel members to reduce scuffing.

When originally placed on the market in this country in 1932, beryllium-copper contained approximately 2¼ per cent beryllium, balance copper. Since that time certain advantages have been found from varying this composition, and several entirely new copper alloys containing beryllium have appeared on the market.

One of the improved variations of the original 2¼ per cent binary alloy has been the development of a material containing 2 per cent beryllium, 0.5 per cent cobalt, balance copper. This alloy has excellent electrical conductivity and particularly favorable age-hardening characteristics, being heat treatable to 40 to 42 R_c from the annealed soft condition by holding for three hours at 600 deg. F. It is an interesting fact that with ½ per cent cobalt content the beryllium can be dropped as low as 1.8 per cent and the same approximate hardness still be obtained by heat treatment alone, although in the latter case the most

Contact spring—auto heater thermostatic control.

Contact backing up spring —motor starter.



Beryllium-copper pipe wrench.

favorable age-hardening temperature is about 35 deg. F. higher.

These cobalt containing alloys with 1.8 to 2 per cent beryllium have a special advantage in that the hardening curve is unusually flat after reaching maximum. In other words, springs made from these materials may be left in the furnace for several hours over the allotted time without danger of over-heating and re-softening. This is of considerable advantage in production heat treating.

Another interesting characteristic is the very high proportional limit. An alloy containing 1.85 per cent beryllium, 0.5 per cent cobalt, balance copper rolled 4 B.&S. numbers hard and then heat treated two hours at 635 deg. F. will show an average proportional limit of 85,000 lb. per sq. in.

A somewhat different type of beryllium-copper alloy, which has been recently put on the market in strip, wire and rod form, is also a combination of beryllium, cobalt and copper but with more cobalt than beryllium. The best known of this type is one containing approximately 0.5 per cent beryllium, 2.6 per cent cobalt, balance copper. This alloy is especially noteworthy for two properties, electrical conductivity and heat resistance. Heat treated strip will show a conductivity of about 50 per cent that of copper at a hardness of 98 R_B and tensile strength of 110,000 lb. per sq. in. Test specimens have been held 80 hr. at 780 deg. F. without loss of these room temperature properties.

This particular composition has been successful in place of phosphor-bronze for electrical contact springs in parts subjected to some over-heating, such as electric range switches. Moreover, in one test contact springs of this alloy have been vibrated 500,000 times at a fiber stress of 70,000 lb. per sq. in. without failure, which indicates excellent fatigue properties.

It is perhaps not generally realized what remarkable properties can be obtained in beryllium-copper castings. An alloy with 2 per cent beryllium and 0.5 per cent cobalt with or without small additional amounts of silicon can be readily hardened to 40 R_C. Such material will show after heat treatment a tensile strength of 145,000 lb. per sq. in. and a compressive strength of approximately 190,000 lb. per sq. in. The addition of cobalt and silicon reinforces the hardening effect, as well as eliminating a tendency toward warpage or cracking on heat treatment, found in binary alloy castings.

This analysis has proved very successful for heavily loaded cast bushings, such as shaft bearings on seam welding machines, clutch bearings on heavy punch presses, etc. Another interesting use has been for metal forming or embossing dies and for cast plastic molds. Where ornament is involved such cast dies can be made more cheaply than those of machined steel and will stand up far longer than any other bronze.

Castings of the alloy 0.5 per cent beryllium, 2.6 per cent cobalt and balance copper seem destined to have a bright future in the electrical equipment field. This unusual material has, in sand-cast form, after heat treatment, a yield point of 85,000 lb. per sq. in. with an electrical conductivity between 45 and 50 per cent of copper. In a number of instances contact jaws for large switches have been designed using castings of this alloy without steel backing-up springs. In other words, the casting itself has had sufficient elastic strength to be used as a spring member to obtain the necessary contact pressure and also carry the required electrical load.

In one 600-ampere switch of this type a 12,000 ampere overload was shot through the contact jaw and held for 35 sec. It was estimated the tem-

perature of the casting rose to approximately 350 deg. to 400 deg. F., and yet after this severe test there was no measurable change in contact pressure, due to the remarkable stability against heat of this beryllium-cobalt-copper alloy.

Experiments are at present going on in trying out various beryllium-copper alloys in cast form for trolley wheels. Indications already point to the possibility of more than doubling the life of a normal wheel without detrimental wear on the wire, using a binary 1 per cent beryllium-copper casting.

Sand-cast beryllium-copper safety tools are becoming increasingly used in many industries where hazardous dust or vapor conditions might be ignited by a spark from a steel hammer or wrench. Quite recently a very serious explosion and fire in a Chicago granary, causing eight deaths and some $4,000,000 property damage, was directly traced to the use of a steel chisel in the presence of explosive dust. Safety engineers and insurance inspectors are realizing more and more the importance of non-ferrous tools in decreasing the chances of such disasters.

Although bronze safety tools have been used for many years in powder works and other hazardous locations, the introduction of beryllium-copper to this field has resulted in the availability of hand tools which very closely approach the durability of steel.

Beryllium-Nickel Alloys

There has been considerable discussion in the press over the last few months concerning the remarkable properties of beryllium-nickel alloys. According to German data, strip containing 1.9 per cent beryllium, 0.5 per cent manganese, and balance nickel can be cold rolled and heat treated to a tensile strength of 260,000 lb. per sq. in., with 6 per cent elongation. An alloy containing 2½ per cent beryllium with 1 per cent manganese and balance nickel can be hardened from the annealed soft condition to 50 R_c by heat treatment alone.

These high strength, corrosion-resisting materials have not yet been put on the market commercially in this country, but the mill procedure is being currently studied, and within a few months domestic supplies of strip, rod, and wire will be available.

It has been suggested that because of their high strength-density ratios and relatively high modulus (29 x 10^6), these alloys will be of interest for heavily stressed structural members in airplane construction. Certainly a material of this type, which can be readily formed into angles or shapes in soft temper and then given very high strength and rigidity by a simple one-step low-temperature heat treatment, would seem destined to have wide usage in this field.

These beryllium-nickel alloys should also prove of considerable importance for springs of all kinds. According to German data, this alloy shows a superior fatigue performance to the best spring steel, a figure of 28 kg. per sq. mm. for torsional endurance limit being determined on unpolished bars in contrast to 24 kg. per sq. mm. for Swedish steel.

Light Alloys of Beryllium

As previously mentioned, pure beryllium, when prepared in commercial quantities, appears too brittle to ever use as a structural metal. Recently 500 gm. of very pure beryllium was distilled in vacuum, remelted in vacuum, and forged under high purity argon, but proved to lack ductility up to 2190 deg. F. The grain boundaries of this metal were entirely clean and yet it appeared about as malleable as bismuth.

Alloys of beryllium and aluminum containing over 70 per cent beryllium seem not to have sufficient ductility to be useful in rolled form, although it is possible that some use for castings of this type of material, where low elongation was not a factor, might be developed.

Small additions of beryllium to aluminum alloys seem either inert or somewhat similar to silicon in their general effect on hardness and strength. There is, however, room for considerably more research in this field.

At present one of the most promising phases for investigation would appear the possibility of increasing the strength at elevated temperatures of piston and cylinder head alloys by means of a beryllium addition.

Unfortunately, beryllium and magnesium do not alloy. Several investigators have recently reported that a small beryllium addition (0.1 per cent and under) was effective in controlling oxidation during the melting of magnesium alloys, but no commercial use of the element for this purpose in this country is yet on record.

Thus, it can be seen that although beryllium is often mentioned in the press as a light metal of particular interest to aviation, there *has actually been no commercial use to date of the element in the light-alloy field.* Continued research may result in finding means of taking advantage of the remarkable combination of lightness and rigidity exhibited by this unusual element, but it seems likely that the amazing capacity of the metal to harden copper, nickel and iron will remain its most important contribution to the advance of metallurgy.

What the Executive Should Know About Job Rating

(CONCLUDED FROM PAGE 41)

accordingly. In like manner, the improvement of working conditions for the job would change the specifications and hence the rating.

Mention has already been made of merit rating systems for rating the abilities and characteristics of each employee. When this is done a comparison can be made showing how well the men are fitting into the requirements set up for each job.

Job analysis points out very clearly the places where the most opportunity exists for the installation of labor saving equipment and for the improvement of working conditions. The ideal toward which to work would be the installation of such machinery and the improving of conditions in such a manner that no skilled labor whatever would be required, all operations being performed automatically by unskilled labor. In this manner all jobs would be reduced in rating to that of the lowest grade.

As previously explained it is not contended that a plant can be so mechanized that no skilled labor whatever will be required. However, the job ratings indicate the direction for improvements to work toward.

Job rating is a management tool that has recently come to the fore. Progressive companies are taking full advantage of its implications. In the face of present labor conditions a scientific approach is needed to the question of hourly wage rates. Too often management has had no facts with which to combat claims of seniority or claims of preference, priority, or favoritism on certain jobs.

STEEL STANDARDIZATION

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IN the Sept. 7 and 14 issues, the author presented tabulated data and discussions dealing with the characteristics of the various types of steel required by machine tool builders. In this, the third section of a five-part story, the discussion of steel requirements continues, there being also included a summarization of a recommended group of steels believed to be suitable for all requirements encountered in most plants.

ALLOY OIL-HARDENING STEEL FOR HEAVY SECTIONS: There are many plants having no requirements necessitating the use of a steel that has high physical properties in heavy sections. However, plants having such applications must select a grade of high-alloy steel to obtain the desired results. This grade of steel should be chosen after very careful consideration is given to all the factors involved, including machineability at high hardness, hardening temperature, mass effect on hardenability, uniformity of hardening, general hardening characteristics, availability, and cost.

Some of the more general data are listed in Table II. Since tests on parts requiring the application of this type of steel usually are not possible, selection should be made only after consulting metallurgists from the various alloy companies and steel mills. The use of this steel should be limited to parts having heavy sections or parts that must be machined at very high hardness. A suggested steel for these special requirements would be SAE 4340. This steel is not generally available in warehouses, and a definite source of supply should be established before it is adopted as a standard grade in any machine tool plant. However, there are many variables that must be considered, and it is possible that other grades might be found more suitable under certain conditions.

NON-DEFORMING OIL-HARDENING TOOL STEEL: All plants have requirements that necessitate the use of a non-deforming oil-hardening tool steel. As may be observed from Table III, all of the steels can be generally classified under two headings; namely, those that contain 1.00 to 1.30 per cent manganese plus chromium, tungsten and/or vanadium; and those that contain 1.50 to 1.80 per cent manganese with very little or no molybdenum, chromium, vanadium or tungsten. The lower manganese grades usually have a slightly wider hardening range than the higher manganese grades; however, the hardening temperature is slightly higher and the non-deforming properties usually are considered not as good.

Although impact data are available only for a few of the grades listed, it may be observed from Table III (Sept. 7 issue) that the values given for the high-manganese type are slightly higher than those given for the low-manganese type. This would seem to indicate that the former type is more suitable for parts subject to impact. The low-manganese steels are usually considered more suitable for parts such as taps, reamers and other types of cutting tools.

Most machine tool builders and manufacturers of related equipment require the use of a non-deforming tool steel for such parts as gages, locating blocks, and parts of intricate designs which must be free of distortion and have uniform hardness. In view of these requirements, it is felt that a steel having the best possible non-deforming properties and the lowest possible hardening temperature is more suitable for the application under consideration. In selecting this grade of steel, Table III (Sept. 14 issue) may be used. In view of the fact that all such grades are marketed under trade names, some suitable steels may have been omitted from the above chart. However, the data as tabulated can be readily obtained for any steels that have not been listed.

Although, as previously mentioned, the steels listed in Table III are divided into two types, it can readily be noted that there are slight variations in the analyses of the different trade-name steels. In view of this con-

dition, it is deemed advisable to select one grade as standard and avoid frequent changes. The steel tentatively selected should be thoroughly tested before it is adopted as a standard grade.

SHOCK-RESISTING TOOL STEEL: A shock-resisting tool steel is essential for parts subject to severe impacts, such as positive clutches that must engage at high speeds, hand and pneumatic chisels, punches, etc. As may be observed from Table IV (Sept. 14 issue, all of the steels listed can be classified generally under three types; namely, chromium, vanadium, tungsten; silicon, manganese, molybdenum and/or vanadium; and silico-manganese. However, there are some grades listed which are slight modifications of these general types, and there is also one grade listed which is a chromium-nickel type.

The chromium, vanadium, tungsten type of steels require a higher hardening temperature but do not tend to decarburize as rapidly as the other types. They are suitable for high temperature work as well as the low temperature applications which are usually encountered by manufacturers of machine tools and related equipment. The silicon, manganese, molybdenum types have a marked tendency to decarburize in hardening. They have approximately the same or slightly better impact properties than the chromium, vanadium, tungsten type at room temperature, and it is believed that their properties are approximately equivalent for such parts as chisels, punches and machine parts, which are subject to high impact, if they can be hardened either in a controlled atmosphere furnace or if the surface subject to impact or wear can be removed after hardening.

The silico-manganese type does not have quite as good properties as the previously mentioned grades. However, it is slightly cheaper than the silicon, manganese, molybdenum grades, and can be used satisfactorily for certain types of application.

For most applications encountered by manufacturers of machine tools or related equipment, it is believed that the silicon, manganese, molybdenum and/or vanadium type of steel will give satisfactory results and, as can be observed from Table IV, if this grade is used a very substantial saving will be obtained. As may be seen from the table, there are slight variations in the analyses of the various trade-name steels of the same type and, in view of this condition, it is deemed advisable to select two or three grades of the desired type steel and thoroughly test them under identical conditions. From this test the most satisfactory grade can be selected and established as a standard item; after this standard item is selected frequent changes should be avoided.

In view of the fact that all of the steels listed in Table IV are marketed under trade names, some suitable steels may have been omitted from the table. However, the data as tabulated can readily be obtained for any steel not listed.

ABRASION-RESISTING ALLOY TOOL STEELS: There are a few requirements, such as lathe centers locating plugs, high production gages, etc., that necessitate the use of an abrasion or wear-resisting grade of alloy tool steel. As may be observed in Table V, all of the steels listed can be classified under two general types, namely, the 1.40 to 1.70 per cent carbon grade and the 2 to 2.30 per cent carbon grade. The lower carbon grades are air-hardening whereas the higher carbon grades are oil-hardening. The 1.40 to 1.70 per cent C grades have better impact, better nondeforming and better machining characteristics than the higher carbon grades. However, the 2 to 2.30 per cent C grades have slightly higher maximum hardness and slightly better wear-resisting properties. It should also be noted that some of the grades of both carbon ranges contain molybdenum. The data as tabulated in Table V tend to indicate that this molybdenum improves the impact properties, which characteristic should be considered in selecting a standard steel of this type. As the heading would indicate, these grades should be used for parts subject to very severe wear conditions, such as high production plug gages, lathe centers and similar parts.

This type of steel tends to decarburize very readily in hardening, and should either be treated in a controlled atmosphere furnace or packed in an inert material such as cast iron borings, if the part is of such a nature that the decarburized surface cannot be removed. As may be observed from the data tabulated in Table V, the price of this material is appreciably higher than the previously mentioned grades, and for this reason it should only be applied to parts where its use is absolutely essential.

Most tool steel mills produce a good grade of high-carbon high-chromium steel, but there is usually a slight variation in the analyses, as may be seen in Table V. For that reason it is considered more desirable to tentatively select a few grades of steels which appear to be most suitable for the applications under consideration, thoroughly test them and finally select one grade as standard and avoid frequent changes, because shifting from one brand to another may result in obtaining slight variation in the required heat-treating cycle which will result in an inferior product. In view of the fact that all of the grades tabulated in Table V are marketed under trade names, some suitable steels may have been omitted. However, the data as tabulated can readily be obtained for any steel not listed.

HIGH-SPEED TOOL STEEL: The problem of selecting a general purpose high-speed steel is far too complicated to be adequately considered in a discussion of this nature. High-speed steels may be grouped into the following five general types:

(1) Molybdenum.
(2) 18 per cent tungsten, 4 chromium, 1 vanadium.
(3) 18 per cent tungsten, 4 chromium, 2 vanadium and molybdenum.
(4) 18 per cent tungsten, 4 chromium, 3 vanadium and molybdenum.
(5) 18 per cent tungsten, 4 chromium, 1 to 2 vanadium, 5 to 12 cobalt.

Each of these types has specific applications that make its use outstanding. However, the writer has found that an attempt to apply too many different grades of high-speed steel in a given plant generally results in the higher alloy grades being used for applications where they are not required and the lower alloy grades being pushed aside unless a very careful tool control system is applied. For most general purpose applications, an 18 per cent tungsten, 4 chromium, 2 vanadium plus molybdenum grade will give excellent results. Although this grade is slightly more expensive than the 18 per cent tungsten, 4 chromium, 1 vanadium, the increased tool performance more than offsets the price differential. Table VI shows a list of some of the steels of this type.

Steel Selection Summarized

Suggested groups of steels that might be satisfactorily employed are as follows:

CLASS I—General application steel (stock materials).

(1) SAE X-1314.
(2) SAE X-1335.
(3) SAE 4145 or SAE 3140.
(4) SAE 4615.
(5) High-carbon tool steel.

CLASS II—Special application steel (purchased to requirements or stocked in very limited quantities).

(1) SAE 4340.
(2) 1.50 to 1.80 per cent manganese non-deforming tool steel.
(3) Silicon-manganese-molybdenum shock-resisting tool steel.
(4) High-carbon high-chromium tool steel.
(5) High-speed tool steel (18 per cent tungsten, 4 chromium, 2 vanadium plus molybdenum type).

There are many factors that might alter the suggested grades. However, it is felt that most machines could be economically and satisfactorily manufactured from the grades as tabulated.

Stock Requirements

In conjunction with the selection of the proper types of steel, it is essential that a carefully planned stock list should be set up. High-production plants can select the exact size and type of finish best suited to each application, but the manufacturer of mechanical equipment cannot economically follow this procedure. At this point it might be well to point out that certain types of plants stock such items as steel plates, brass bars of all types, cast iron bars, forgings, etc. However, items such as these are not considered in this paper.

Round Bar Stock

Round bar stock is the predominating item used, and the selection of the proper stock is of vital importance if the most favorable prices are to be obtained. To set up the most suitable list, the characteristics of the various different commercial finishes should be considered.

Hot-rolled steel usually has a moderately rough black finish. The size tolerances are rather wide, ranging from plus or minus 0.005 in. for 5/16-in. stock to plus or minus 1/64 in. for 2-in. diameter stock, and up to plus 3/32 in. minus 0.000 in. for 6⅝-in. diameter stock. There is also an out-of-round tolerance that ranges from 0.008 in. for 5/16-in. stock to 0.070 in. for 6⅝-in. stock.

Properly processed hot-rolled steel is generally considered very desirable for parts that require unbalanced machining, as for instance, long keyways, eccentrics, etc.

Cold-drawn steel has a smooth bright surface free from deep scratches and pit marks. This type of finish is usually available only in sizes up to and including 2 15/16-in. diameter.

The medium to high-carbon and alloy oil-hardening grades of steel carry a slight amount of surface decarburization. Generally this has no disadvantages. However, for parts requiring maximum surface hardness a minimum of 0.030 in. on a side should be removed. Size tolerances are much closer than those allowed for hot-rolled stock. For example, alloy cold-drawn bars are held to plus or minus 0.002 in. for sizes up to 2 in., and to plus or minus 0.003 in. for sizes up to 3 in. The tolerances on low-carbon steel bars are plus 0.000 in. to minus 0.002 in. for sizes up to 1 in., plus 0.000 in. to minus 0.003 in. for sizes up to 2 in., and plus 0.000 in. to minus 0.004 in. for sizes up to 3 in.

Cold-drawn stock has a much higher yield strength, is slightly harder and has less ductility than the corresponding grade of hot-rolled that has been given the same treatment with the exception of the cold drawing operation. It is generally considered that the cold drawing operation improves the machineability slightly. Although this type of stock is subject to slight distortions when machined and heat treated, the writer has observed thousands of parts made from cold-drawn stock without noting serious trouble from that source, except where the machining operations were very unbalanced.

Turned and polished stock has the same characteristics as hot-rolled steel, except the surface is finished. The size tolerance is the same as allowed for the corresponding grade and size of cold drawn material. This grade of finish is slightly more expensive than cold-drawn for sizes smaller than 2 15/16 in. However, for the larger sizes, it carries the same base price as cold-finished stock.

Ground and polished stock (from cold-drawn bars) has a high-class finish that is relatively free from surface decarburization. The steel has the same general machining characteristics as cold-drawn. Commercial alloy bars are held to a tolerance of plus 0.000 in. to minus 0.002 in. for sizes up to 1⅞-in. diameter. However, this type of finish takes an extra which varies from $5.50 per 100 lb. for ⅛ to 5/32 in. diameter sizes, down to 65c. per 100 lb. for sizes 1 9/16 to 1⅞ in. diameter. In view of this high extra, it is obvious that this stock should only be used for parts requiring the closer tolerance and high-grade finish.

For long bars subject to severe machining operations that would tend to cause serious distortion, turned and ground stock is available. This particular type of stock is frequently used for such parts as engine lathe lead screws. However, a new manufacturing process only recently developed may prove far superior to the plain turned and ground stock for the above application. This new development consists of a combination of heavy drawing and heat treating. A high strength steel of approximately 125,000 lb. per sq. in. tensile strength with a hardness of about 248 to 269 Brinell is produced. The bars are ground to produce the desired finish, if they are to be used for such parts as lead screws. Preliminary tests indicate that the steel processed in this manner has less distortion than the turned and ground stock. It was also very surprising to note the excellent machineability.

All types of cold-drawn steel can be stressed relieved after the cold mechanical operation with consequential improvement in tensile values and less distortion during machining.

Selecting Round Bar Stock

Round bars are listed in commercial price lists as follows:

Finish	Size Range	Approximate Number of Sizes
Hot-rolled	5/16 to 10 in.	150
Cold-drawn	1/16 to 2 15/16 in.	104
Turned and Polished*	1⅛ to 7 in.	108
Ground and polished*	⅛ to 6 in.	156

*Larger sizes are available on special order.

As outlined earlier in this discussion, five grades of steel are recommended for general use. That is, it would be theoretically possible to have approximately 2500 different sizes of round bar stock. Such a large number of sizes would never be specified. However, there are many organizations that have 600 to 700 sizes of standard round stock.

The number of stock sizes can only be reduced by eliminating some of the various types of finishes and increasing the size intervals. Hot-rolled bars have the lowest price set-up and might at first consideration appear to be the most suitable finish to select for general applications. However, such action may have certain disadvantages, which can be best shown by examples.

Example No. 1

A lot of 25 gears are to be formed on an automatic screw machine. The

gears have a maximum O.D. of 3 15/16 in. and an overall length of 6 in. Comparison of the net costs of material required for this lot of gears made from SAE 4145 steel hot-rolled and made from SAE 4145 turned and polished.

Commercial hot-rolled steel will operate more satisfactorily in an automatic screw machine if it is turned to a finished size. To obtain a 14-ft. finished bar 4 in. in diameter requires a rough bar at least 4¼ in. in diameter. The turning operation, including a reasonable overhead charge, will cost approximately 25c. per ft. An operation of this type usually will result in a delay of two to three days on the production schedule.

If turned and polished steel is used the gear can be made from a 4-in. diameter bar and the turning operation is eliminated.

To make a concrete example of the cost element, let it be assumed that the steel is purchased in 10-ton lots.

	Hot-Rolled	Turned and Polished
Base price	$2.70	$3.35
Alloy extra	0.55	0.55
Annealing extra	0.75	0.75
Straightening extra	0.10	...
Size extra	0.25	0.90
Quantity extra	0.00	0.05
Total (per 100 lb.)	$4.35	$5.60

The net steel cost of turned and polished stock is: 42.73 lb. per ft. x 12.5 ft. x $0.055 per lb. = $29.38.

The direct steel cost of the hot-rolled stock is: 48.23 lb. per ft. x 12.5 ft. x $0.0435 per lb. = $26.22; the turning cost (approximately) = $3.50; therefore, the net steel cost of the hot-rolled stock = $29.72.

In this particular case the turned and polished steel was slightly cheaper. However, an even greater advantage is the fact that an operation can be eliminated and the production schedule speeded up.

Example No. 2

A lot of 25 shafts having various step diameters are to be rough turned on a hand screw machine. The shafts have a maximum O.D. of 2 1/16 in. and an overall length of 24 in.

Comparison of the net costs of material required for this lot of shafts made from SAE 4145 steel hot-rolled and made from SAE 4145 steel cold-drawn.

The surface of a hot-rolled bar is too rough to permit the use of box tool guide rollers set in advance of the cutting tool. Therefore, it is necessary to turn the shaft the entire length with the guide rollers set slightly back of the cutting tool to obtain a suitable surface on which the leading guide rollers can operate when the various smaller diameters are turned. This operation, including a reasonable overhead charge, will cost approximately 60c. per shaft. If hot-rolled steel is used, 2¼-in. diameter stock will be required. At this point it might be well to mention that the use of the leading guide rollers is essential to insure concentric diameters.

The surface of a cold-drawn bar is smooth enough to permit the use of leading box tool guide rollers directly, and the full length turning operation can be eliminated. A 2⅛-in. diameter cold-drawn bar is large enough to finish 2 1/16-in. diameter.

The cost comparison of the two grades will be made on the assumption that both grades would be purchased in 2½-in. ton lots.

	Hot-Rolled	Cold-Drawn
Base price	$2.70	$3.35
Alloy extra	0.55	0.55
Annealing extra	0.75	0.75
Straightening extra	0.10	...
Size extra	...	0.35
Quantity extra	0.10	0.20
Total (per 100 lb.)	$4.20	$5.20

The net steel cost for the shafts made of cold-drawn stock is: 12.06 lb. per ft. x 50 ft. x $0.052 per lb. = $31.36.

The direct steel cost of hot-rolled stock is: 13.52 lb. per ft. x 50 ft. x $0.042 per lb. = $28.39; turning cost (approximately) = $15.00; and then the net steel cost for the shafts made of hot-rolled stock = $43.39.

In this example an appreciable net saving is clearly shown. However, most plants that use hot-rolled steel also carry some cold-drawn stock, at least in the smaller sizes. It is assumed that it is desirable to purchase steel in this size range in 2½-ton lots. However, if the tonnage is equally divided between hot-rolled and cold-drawn steel, the price of the cold-drawn stock increases $2 per 1000 lb. and the price of hot-rolled increases $1.50 per 1000 lb.

The above examples were picked at random from numerous similar cases. They clearly show that the first cost of cold-drawn or turned and polished steel is greater than the first cost of hot-rolled steel. However, they also show that the extra operations required on the hot-rolled bars more than offset the higher first cost. Furthermore, the examples did not consider the machineability. This factor is rather intangible, but it is generally conceded that cold-drawn stock has slightly better machining characteristics than the corresponding hot-rolled stock.

If parts are not machined in an automatic or hand screw machine, the advantage of cold-finished stock is lost. Sizes beyond the capacity of available equipment of this type, or sizes from which a predominating number of parts are manufactured in lots too small to permit their use, should not be carried as cold-finished steel. A careful analysis should be made as to the comparative cost of producing the larger parts by the various methods before limiting the cold-finished sizes. Some of the larger manufacturers of mechanical equipment are now using finished stock over the entire range and have installed the necessary large automatic screw machines. However, the writer is of the opinion that most average size plants will find 5⅜ in. diameter a suitable limiting size. This specific size is mentioned because most plants have few parts in their smaller machines that require larger stock and the predominating number of parts larger than 5⅜ in. are not run in lots that would warrant the use of an automatic machine. It is also important to note that the size extra for finished bars increases rather rapidly for sizes above this limit. However, the writer has only mentioned that size limit in an arbitrary manner and there are numerous variables in different plants that may dictate another limiting size.

As previously stated, there are applications where each of the available types of finish has a definite advantage. However, the duplication of sizes with different finishes should be avoided. Unnecessary duplication results in the following cost increasing items:

(1) Larger steel inventory required to avoid shortage on specific sizes.

(2) Increased cost due to smaller quantities of each size required.

(2) Increased difficulty of maintaining a balanced stock inventory.

(4) Increased difficulty of obtaining steel to rigid specifications.

(5) Increased number of records.

For the average manufacturer of mechanical equipment the writer would suggest the following stock set-up for the standard grades of steel:

Size Range	Finish	Size Intervals
⅛ to 1½ in.	Cold-drawn	1/16 in.
1⅝ to 2⅞ in.	Cold-drawn	⅛ in.
3 to 5¼ in.	Turned and polished	¼ in.
5½ to 6 in.	Hot-rolled	¼ in.
6½ to 9½ in.	Hot-rolled	½ in.

(CONCLUDED ON PAGE 81)

FLAME GOUGING:

AN ECONOMICAL METHOD OF GROOVING STEEL— II

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By H. E. ROCKEFELLER
Manager, Process Development,
The Linde Air Products Co.,
New York

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IN the first part of this article, in THE IRON AGE of Sept. 14, Mr. Rockefeller described briefly a number of applications of the oxy-acetylene gouging process, including the removing of metal from the underside of welds, the removing of defective welds, and the making of U-grooves in plate edges preparatory to welding. In this second article he describes the equipment and technique employed and gives data on the types of steel which can be gouged.

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THE only special equipment required for gouging operations is a series of three nozzles, each designed differently as to size and number of preheat orifices and size of cutting orifice so as to cover a wide range of gouging speeds and groove dimensions. They are designated by the numbers 13, 19 and 25 which refer to the approximate diameter of cutting oxygen orifice in hundredths of an inch. No. 19 nozzle, for example, has a cutting oxygen orifice 0.19 in. in diameter. The nozzles are swaged at an angle that laboratory tests and field experience have indicated as best from the standpoint of gouging accuracy. These nozzles are for use with a standard medium-pressure cutting blowpipe as shown in Fig. 11, or for some applications with a straight blowpipe which is often more convenient.

Progressive Gouging Technique

In general, there are two different techniques for gouging: One in which a groove is made progressively across a plate, as in the removal of metal from the backside of welds; the other, known as spot-gouging, in which a small area is gouged out, as in the removal of isolated weld defects.

In the first or progressive method, the correct nozzle is selected and oxygen and acetylene pressures regulated to give the desired width and depth of groove as indicated in Table I.

In starting the cut, the blowpipe is held with the end of the nozzle at an angle of approximately 20 deg. to the horizontal and above the line of the cut, as shown in Fig. 12. The preheat flames are played on the spot where the cut is to be started until the surface reaches the ignition point. The cutting oxygen lever is then gradually depressed. The cut progresses slowly while the angle of the end of the gouging nozzle is gradually reduced to the correct operating angle. This angle, approximately 5 deg. as shown in Fig. 13, will be readily discernible by the operator. If the nozzle is not lowered far enough, some of the slag will tend to flow backward in the cut toward the operator, while if the blowpipe is lowered too far, the groove will become shallow and will soon be lost.

In starting the gouge, the blowpipe is held so that the tips of the inner cones of the preheat flames are just touching the work. After the cut is started, however, the nozzle is held above the surface of the cut, with the tips of the inner cones from ¼ in. to ½ in. in back of the reaction zone. Best results are obtained when the blowpipe is held so that the nozzle clears the bottom of the groove as it progresses along the cut.

Contour of the Groove

When it is necessary to change the direction of the cut, the angle of the nozzle in relation to the work should remain unchanged while the blowpipe is gradually swung around in the new direction. Too sharp turns should be avoided lest the outside wall of the groove be cut into by the molten slag. It is advisable to use lower operating pressures and speeds than those shown in Table I when not cutting in a straight line.

The depth of the groove depends upon the size of the nozzle, speed of

progress, and the angle between the cutting oxygen stream and the work. To cut a deep groove, the angle of the blowpipe is increased in relation to the groove, and the speed is correspondingly decreased. In order to make a shallow groove, the procedure is reversed. With the establishment of the correct depth of cut, it is an easy matter to maintain this depth throughout the full length of the cut. Grooves can be made that are as deep or slightly deeper than they are wide.

The contour of the groove is dependent upon the characteristics of the nozzle used and the operating conditions. If the cutting oxygen pressures are too low, the cutting takes on a washing effect, leaving ripples in the bottom of the groove. The effect of too high cutting oxygen pressures, especially in shallow grooves, is to advance the portion of the cut nearest the surface ahead of the rest of the molten zone, with the result that the cut is finally lost.

Spot Gouging

In gouging out a single spot, such as a weld defect, the defect is first marked out on the surface of the weld. Then the operator adjusts the preheat flames of the blowpipe so that they are slightly oxidizing. A point is selected a little to the rear of the mark, depending upon how deep the defect is believed to be. The cut is started in the usual manner by preheating the spot, but instead of reducing the angle of the nozzle, it is increased gradually so that the oxygen jet is directed downward, making the cut increasingly deep. As in deseaming, a little experience enables the operator to observe readily any defects which appear as dark spots in the molten zone.

The blowpipe should be held so that the inner cones of the preheat flames are approximately 1/16 in. above the plate surface at all times during the cut. The use of oxidizing preheat flames provides a sufficient amount of concentrated heat for starting cuts on the surface of the weld metal, thus doing away with the necessity of first raising a fin with a chisel. The nature of the resulting cut is a narrow U-shaped groove which can readily be filled with weld metal.

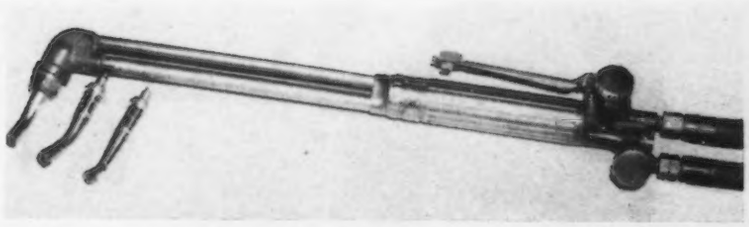


Fig. 11—Gouging operations are performed with a series of three special nozzles designed for use with a standard medium-pressure cutting blowpipe.

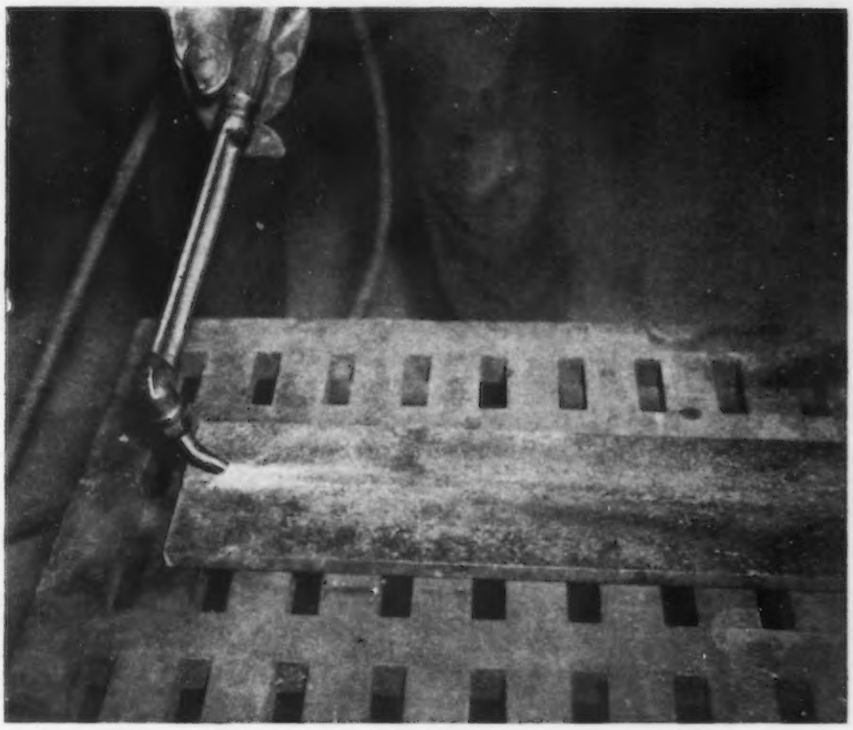


FIG. 12—During preheating, the end of the nozzle should be at an angle of approximately 20 deg. to the line of the cut.

Steels Which Can Be Gouged

Among the steels allowable under sections S-1, S-2 and S-26 of the

TABLE I—OPERATING DATA FOR GOUGING NOZZLES

Nozzle No.	Regulator Pressure,* lb. per sq. in. Acetylene	Regulator Pressure,* lb. per sq. in. Cutting Oxygen	Consumptions, cu. ft. per hr. Acetylene	Consumptions, cu. ft. per hr. Preheat Oxygen	Consumptions, cu. ft. per hr. Cutting Oxygen	Approximate Speed, ft. per min.	Approx. Gouge Dimensions, in. Width	Approx. Gouge Dimensions, in. Depth
13	10	25	35-38	35-38	78- 82	1.0-1.2	5/16	1/8-3/16
13	10	30	35-38	35-38	88- 92	1.4-1.6	5/16	5/32-7/32
13	10	35	35-38	35-38	98-102	1.5-1.8	5/16	3/16-1/4
19	10	35	50-55	50-55	170-175	1.6-1.9	3/8	3/16-1/4
19	10	40	50-55	50-55	188-192	1.8-2.0	7/16	7/32-9/32
19	10	45	50-55	50-55	205-210	1.9-2.2	7/16	1/4-3/8
25	10	40	55-60	55-60	278-282	1.9-2.2	1/2	3/16-1/4
25	10	45	55-60	55-60	308-312	2.3-2-6	1/2	1/4-3/8
25	10	50	55-60	55-60	328-332	2.5-2.8	1/2	5/16-7/16

*Pressures measured ahead of 12½ ft. of 3/16 in. hose in series with 25 ft. of ⅜ in. hose.

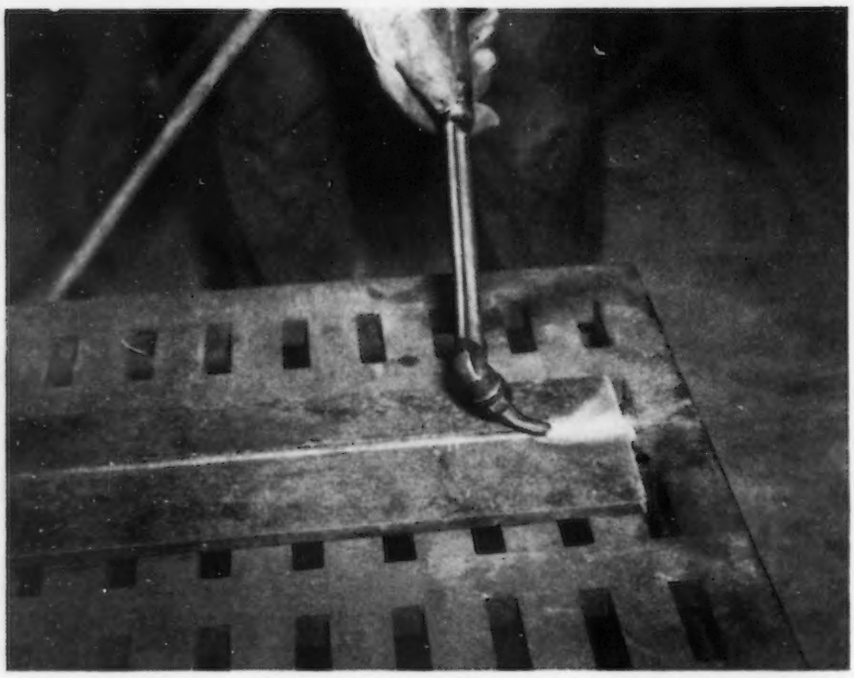


FIG. 13—While the cut is progressing the angle between the end of the nozzle and the work should be reduced to about 5 deg.

A.S.M.E. Boiler Construction Code, which cover specifications for plate used for boilers and pressure vessels, are high tensile strength carbon steel plates 2 in. and under in thickness and having a maximum carbon content of 0.35 per cent. The code is similar to the A.S.T.M. and A.P.I. codes covering like material. Steels of this type, having a carbon content of 0.35 per cent and under, can be processed with the gouging blowpipe with excellent results.

As a general rule, gouging should not be applied to air-hardening steels where the hardness resulting from the operation will be objectionable. For example, clips should not be removed from the surface of a vessel where the carbon content of the plate is so high as to cause the formation of a hardened zone having decreased ductility.

Care also should be used in gouging alloy steels. Test cuts should first be made in scrap pieces, and the operator should determine from these cuts whether the characteristics of the metal adjacent to the cut have been changed too drastically.

As already mentioned, good results are obtained on cast steels if proper techniques are followed. Cast iron, however, cannot be gouged. Gouging operations are readily performed on malleable iron, but the operator should remember that the heat of the operation will destroy the malleable properties and produce a hardened zone about the cut. Yet if gouging is done in preparation for welding, the subsequent heat of welding will give the same resulting structure in and around the weld no matter what method of preparation is used.

In conclusion it might be said that gouging should not be considered a cure-all for all metal-grooving operations. The process quite naturally has its limitations. However, in the short time that gouging has been tried in the field, numerous applications have already been uncovered and it is safe to say that the process has nowhere nearly reached its final possibilities.

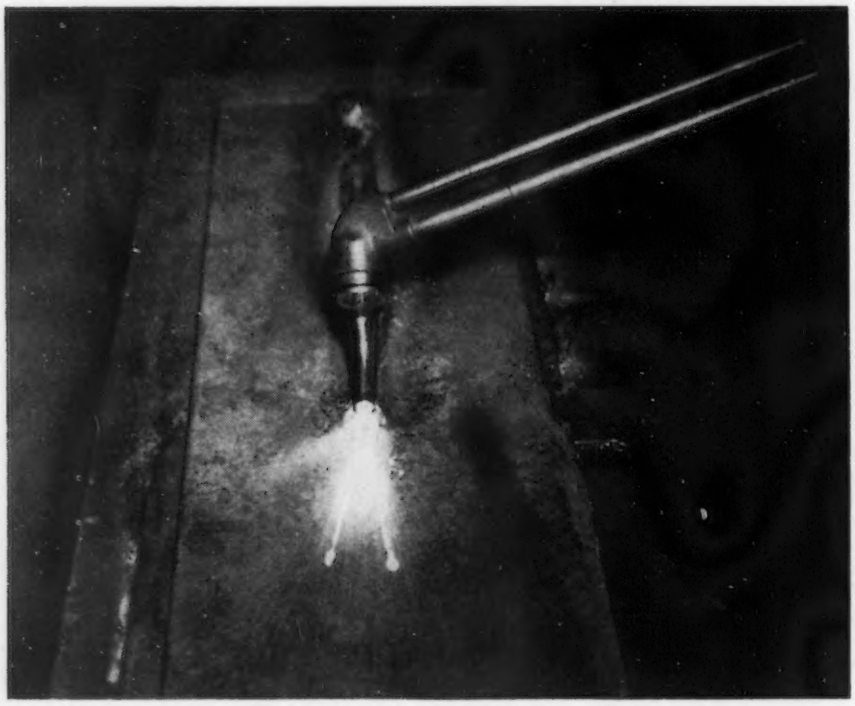


FIG. 14—This close-up view, looking along the line of cut, illustrates the gouging operation.

NLRB Orders DeKalb Union Disestablished

The board's action was based upon results of a secret ballot election, held Aug. 19, 1938, resulting in a count of 18 votes for the Pattern Makers' and 18 votes for the SWOC. The board stated, however, that it would promptly entertain a new petition relating to the pattern makers from either organization.

Since neither organization received a plurality, the board held it was unable to follow its usual practice of conducting successive run-off elections, eliminating from each successive ballot the organization receiving the lowest number of votes in the preceding ballot until a representative was selected by a majority or a majority signified that none of the contestant organizations was desired as a representative.

The board certified the SWOC for the production and maintenance unit, excluding the pattern makers.

HYDRAULIC TYPES PREDOMINATE IN RECENT PRESS DESIGNS

By FRANK J. OLIVER
Associate Editor, The Iron Age

AMONG the hydraulic type presses announced in recent months are large double-action types for sheet metal drawing; straightening and bending presses, and a high speed forging press. A variable delivery triple plunger pump has been developed for press and other service. Among other types of sheet metal machinery may be found a horning press, air drop stamp for aircraft work, improved press brakes and shears, new types of riveters, punch press drive, pneumatic die cushion, and die sets. A controlling ammeter has recently been applied to the stopping of an automatic press, should stampings pile up under the die.

FOR the drawing of large sheet metal products, a self-contained hydraulic Fastraverse double-action press of 1000-ton capacity has been built recently by the *Hydraulic Press Mfg. Co.*, Mt. Gilead, Ohio, that offers a dual range of working pressures and speeds, thus constituting virtually two presses in a single frame. For heavy work, the main ram is actuated by three rams located in the press head, but for lighter work only the central ram need be used, with faster action under load. The changeover in operation is accomplished through a selector valve. No other valves are used in the hydraulic circuit, however, ram action being controlled through the action of two Hydro-Power variable delivery radial pumps.

The second pressing member of this double-acting press is that of the die cushion located within the press bed. It takes its power from the main hydraulic system and the pressure can be adjusted to suit requirements. The long main slide of the upper platen is guided at eight points instead of the usual four to assure accurate alinement of the slide despite its large proportions. The cushion slide is also gib guided. All piping, linkage and operating stations have been built into the press frame.

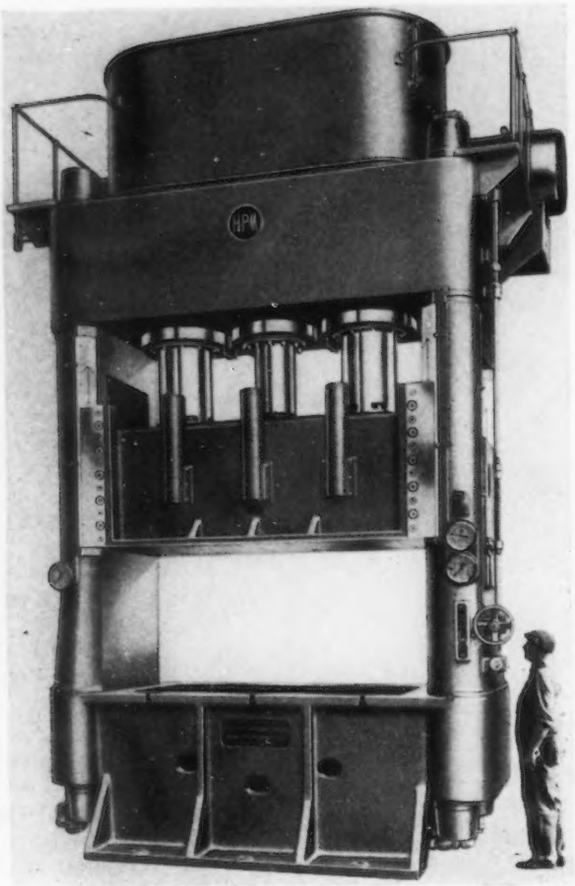
Another H-P-M double-action hydraulic press has recently been developed also in which the main slide is actuated by a double-acting piston type ram working in a smooth bored steel cylinder. It also has a hydraulic die cushion platen located under an extremely heavy steel bolster plate. This machine, with main slide 72 x 60 in., has a capacity of 500 tons.

Small Straightening Presses

A 25-TON hydraulic press for straightening, assembling and broaching has recently been completed by the *Denison Engineering Co.*, Chestnut and Water Streets, Columbus, Ohio. The power unit is mounted integrally with the fabricated steel frame and consists of a 15-hp. motor connected to a hydraulic pump. Ram speed is 24 in. per min. downward and 48 in. on the return. Total stroke is 18 in. The control mechanism consists of one four-way operating valve connected by linkage to a special pressure control valve which is operated by a bar type foot operated pedal. Stepless tonnage variations up to the capacity of the press may be had by simply applying slightly greater pressures of the pedal. Reversal occurs when the pedal is released. Length of the reversal stroke may be decreased by an adjustable stop, which also acts as an unloading valve control. At the top of the reverse stroke the pumps are unloaded to the oil reservoir at zero pressure.

THE *Colonial Broach Co.*, Detroit, has expanded the Junior line of broaching and assembly presses to include five basic models in four capacity ranges and three strokes. The line now includes a ¼-ton press with 9-in. stroke, the previously announced ½-ton model with 12-in. stroke; a 1-ton model with 12-in. stroke, and another of similar capacity but with an 18-in. stroke. A 2-ton hydraulic press with 18-in. stroke completes the line. All models are similar in general design and construction, differing mainly in dimensions. The self-contained operating system in all models includes constant delivery pumps of 1000-lb. pressure capacity submerged in an oil reservoir. The pumps are direct-driven from standard electric motors vertically mounted within the frame.

Ram control is through a four-way



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FOR lighter work than its 1000-ton capacity, only the central of the three rams may be employed, thus giving this H-P-M hydraulic double-action press a dual range of working pressures and speeds. Main slide measures 108 x 60 in. and the hydraulic die cushion, 90 x 40 in.

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hand operated control valve, spring centered.

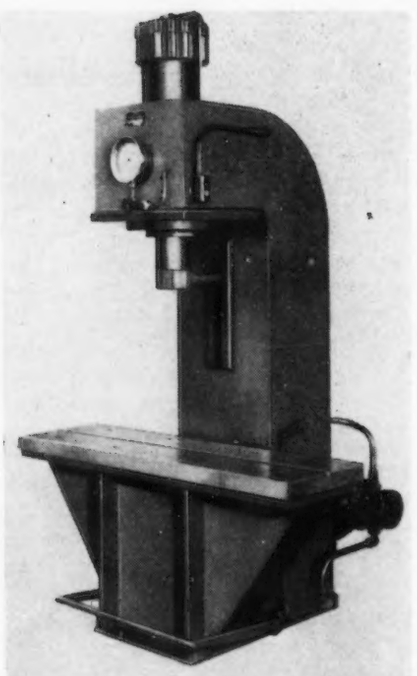
Hydraulic cylinders are available for working pressures up to 1000, 1500 and 2000 lb. per sq. in., the bodies being made of SAE 1015, 1025 and 1045 steel respectively. Tie rods are SAE 4135 alloy steel and pistons, chrome-molybdenum-vanadium iron. Chevron packings are used.

THE *Florence Pipe Foundry & Machine Co.*, Florence, N. J. (*R. D. Wood Co.*, Philadelphia, selling agents) recently completed construction of a high speed 2000-ton forging press with which it is possible to obtain 10 complete operating cycles per min. The power unit consists of a radial piston pump having a capacity of 83 gal. of oil per min. at 2500 lb. per sq. in. pressure, operated by 125-hp. motor. Operation during the work-

valve, operated either manually or automatically by the ram travel through use of the adjustable stops. The machines can be operated with either automatic return of the ram after the power stroke, or with the ram stopping at the bottom as well as the top of its travel. Ram speed down is 30 ft. per min., with high speed return of 60 ft. per min. in all models.

Hydraulic Bending Machine

FLEXIBILITY, ease of operation and ample power are claimed for the new No. 700 series hydraulic ram type bending machines introduced recently by the *Wallace Supplies Mfg. Co.*, 1310 Diversey Parkway, Chicago. Made in five sizes, the machines will bend 6-in. to 12-in. extra heavy pipe and tube up to 15 in. o.d. and ¾-in. wall thickness; also structural shapes and bars with special tooling. Standard tools will handle pipe and conduit. Minimum radii are five times the nominal pipe size or six times the tubing o.d. The position of the two stationary dies attached to large pins on the cross-T of the press frame determines the radius of the bend. The changing of dies is a simple operation. Positive control of the bending die attached to the ram is secured by a single



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SELF-contained Denison 25-ton press for straightening, assembling and broaching operations. Stroke is 18 in.

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WALLACE No. 700 series hydraulic ram type bending machine shown at the completion of a 6-in. extra heavy pipe bend.

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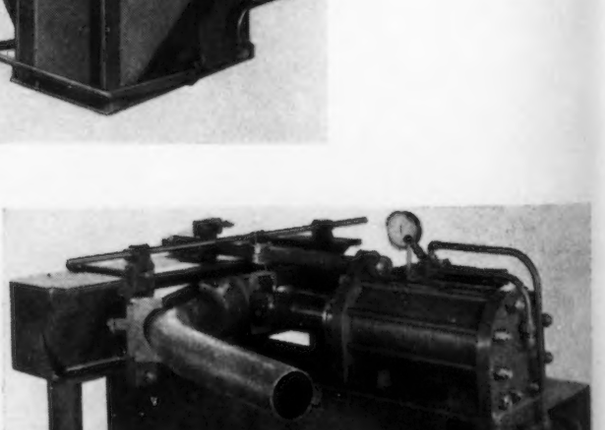

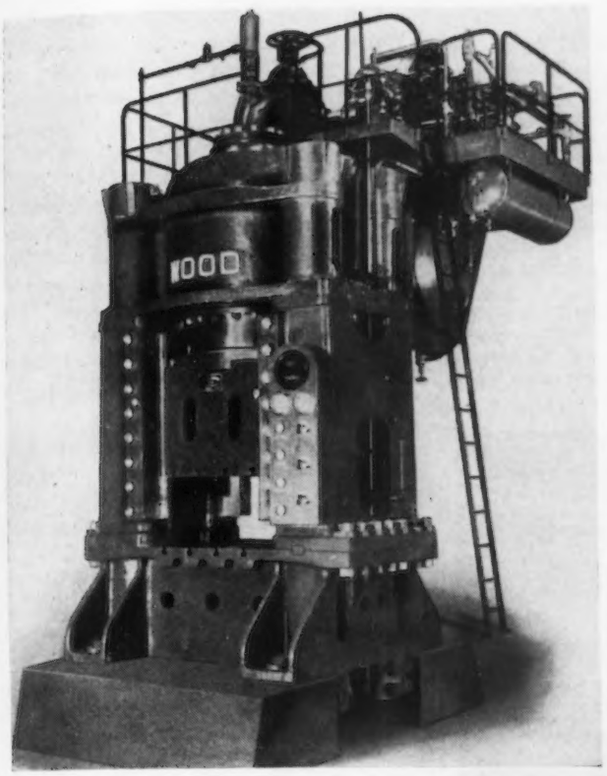

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THIS Wood 2000-ton forging press is capable of making 10 complete operating cycles per min. A 125-hp. motor drives the variable delivery oil pump.

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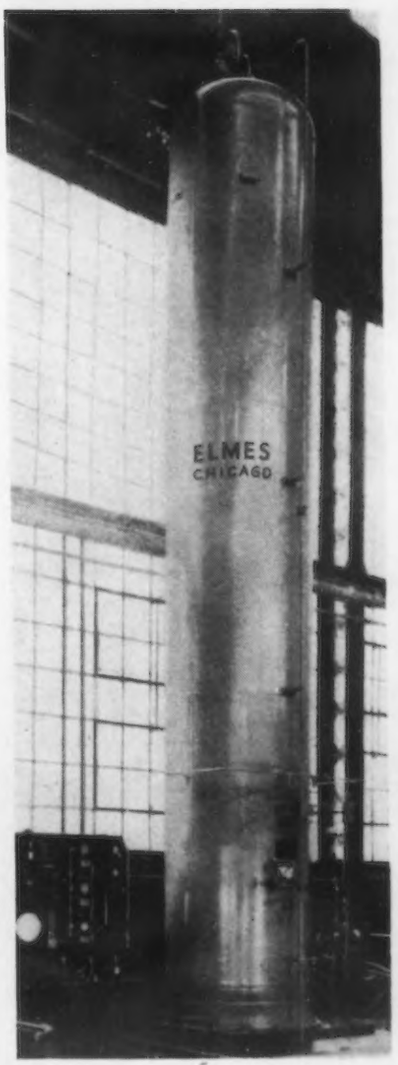
BELOW

THE Elmes air-ballasted, pistonless type hydraulic accumulator illustrated has a capacity of 275 gal. at 2500 lb. per sq. in. working pressure.



ing cycle is automatic, the ram returning to open position and remaining for the period determined by the operating cycle before again descending upon the work. Working pressures exerted upon the work may be regulated from zero to maximum.

Ram is 45 in. in diameter, 54 in. long, weighs 16,000 lb., and is cast in Meehanite metal so as to provide the unusual physical properties required for such high speed, high pressure action. The four ram guide plates, one on each side of the column, are also of the same material.

Air Ballasted Accumulators

THE *Charles F. Elmes Engineering Works,* Chicago, has developed an improved line of air ballasted accumulators for use with hydraulic operating equipment. High and low pressure units are available in any desired capacity. The pressure vessels conform to all safety codes and the controls are simple, automatic and positive. All adjustments are made from a conveniently located control panel.

One of the obvious advantages of air ballasted accumulators is that because of their light weight they do not require pits and heavy foundations or ballast. Also the amount of floor space required is small. Line shocks, common with the weighted type of accumulator, are avoided with the air ballasted type. Furthermore, variations in pressure are avoided. Maintenance costs are reduced by elimination of internal packing.

Variable Delivery Hydraulic Pump

A VARIABLE delivery hydraulic pump operating on a new principle is being marketed by the *Aldrich Pump Co.,* Allentown, Pa., for application to hydraulic presses, hoists, ship steering gear, oil burner supply and even boiler feeding. The operation of the pump is not confined to high grade lubricating oil as it is designed to handle any free flowing liquid, including water, at pressures ranging from 200 to 15,000 lb. per sq. in. Control of rate of delivery may be accomplished from any point either manually or automatically through a hydraulic servo-control unit governed by pressure, temperature or flow regulators. These Aldrich-Groff Powr-Savr pumps are made in four sizes, with strokes from 2 to 7½ in. and from 11 to 110 brake horsepower. Drive is by a constant speed a.c. motor or a steam turbine.

The pump is a vertical triplex plunger design employing a unique method of obtaining variable stroke with a constant speed crankshaft. The main connecting rods are pivoted to

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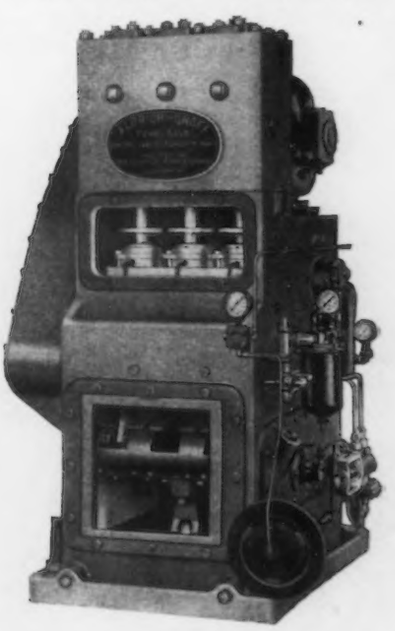
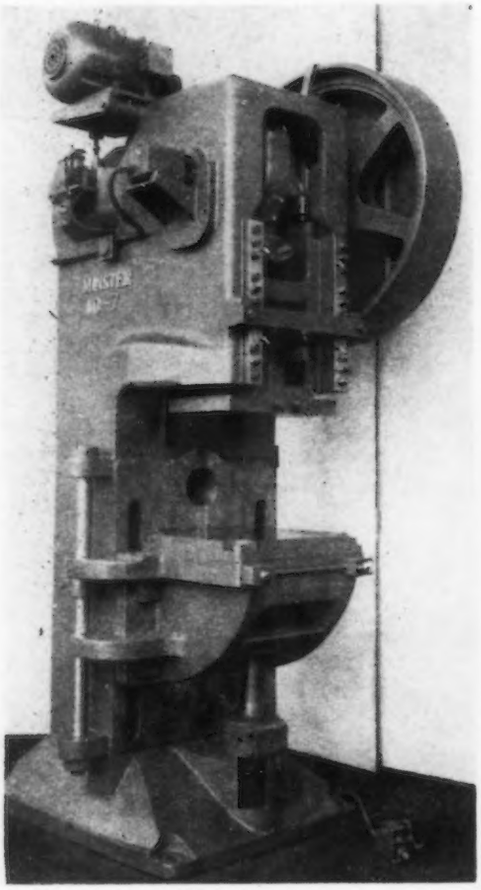
BELOW

THE newly developed Aldrich-Groff Powr-Savr pump is a variable-stroke vertical triplex type designed for hydraulic press application, liquid process charging, oil burner supply, ship steering gear and boiler feeding.





ABOVE

ONE of a number of newly designed Minster 10-7 horning and wiring presses, built by the Minster Machine Co., Minster, Ohio. The press has 71-ton capacity and is equipped with an electrically controlled, air operated combination friction clutch and brake. Frame is of heavy cast semi-steel construction, so designed that with the use of an adjustable swinging table, it may be converted into a gap press. The opening in the frame will accommodate a horn shank 7 in. in diameter.

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links extending from the bottom of the piston crossheads to bronze guide blocks that slide within a curved sector track of the so-called stroke transformer. In the neutral position of this track, the links merely oscillate back and forth about the pivot point on the cross head and no motion is imparted to the pump plungers. As the track is tilted, the full crank stroke gradually becomes effective. Frictional losses are light since work loads tend to relieve the pressure on the sliding shoes.

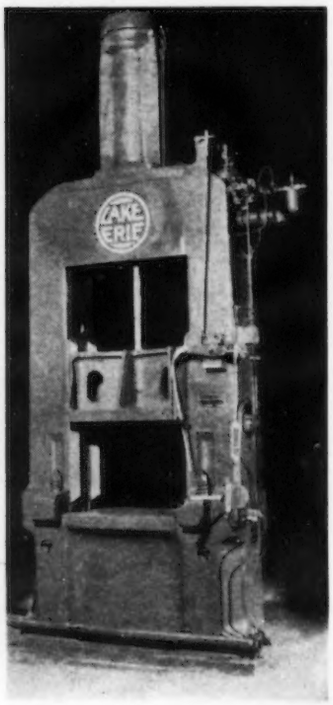
Press Brake

COMBINATION cast steel and rolled plate construction is used in a press brake recently added to the line of the *E. W. Bliss Co.*, 53rd Street and 2nd Avenue, Brooklyn. Side housings are made of cast steel of generous section, while the slide and bed are made of rolled steel plate. By means of a gear reduction unit, speed of operation can be varied from 10 to 20 strokes per min. Capacity is for bending a ½ in. by 12 ft. mild steel plate. Drive shaft runs on Timken bearings. Stub shaft driving the connections are full eccentric, with the main, eccentric and intermediate bearings bronze bushed. The twin drive gears are made of steel and run in cast iron oil-tight housings. Drive from motor is by V-belt.

Control of the machine is through a newly designed hydraulic clutch with push button control for inching and stopping at any point. The clutch may also be actuated by means of a foot treadle. An overload feature is also incorporated in this brake. The slide is equipped with a ram shoe for large area dies, which may be removed of course when narrow bending and forming work is to be performed. A reversible motor adjusts the slide within 8 in. Stroke is also 8 in.

BELOW

AIR operated drop stamps are being widely used in the aircraft industry for short-run stamping work on alloys of low ductility, and for thin, quick cooling hot work. The one pictured was recently built by the Lake Erie Engineering Corp., Buffalo. Hand lever gives sensitive control of speed and power. Cam setting is adjustable for positive and oscillating motion. Safety is provided by holding ram in two upper positions by gravity drop safety dogs, released by air cylinders through action of the foot treadle. Over travel is prevented by air cushion on top of cylinder.



Pneumatic Riveter

A COMPLETE riveting stroke in less than 1 sec. is claimed for a new pneumatically actuated riveter developed by *Hanna Engineering Works*, Chicago. When operated at 80-lb. air pressure, this riveter will exert 20 tons pressure on the dies and will drive rivets up to ⅜ in. diameter cold, and ½ in. hot. Die stroke may be adjusted up to 3 in. maximum, and full pressure is maintained throughout the stroke.

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AT RIGHT

THIS new 12-ft. Bliss press brake has slide and bed made of rolled steel plate and side housings of cast steel proportioned to give ample rigidity.

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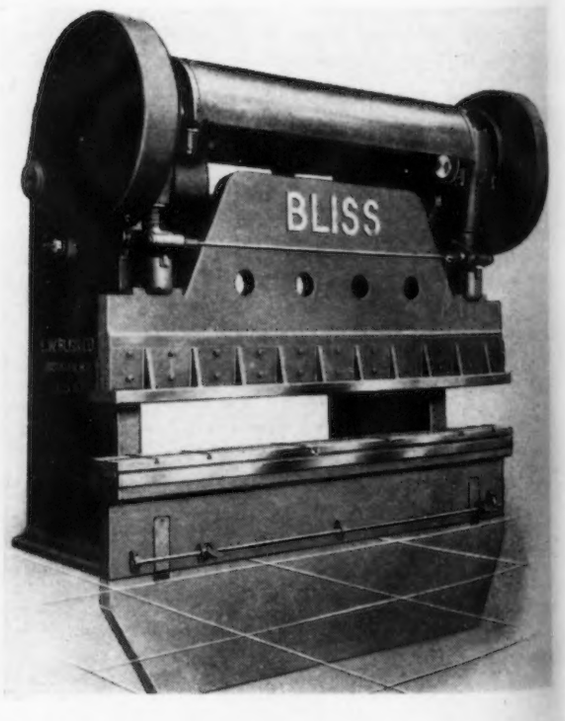

The driving jaws are of the alligator or nut cracker type, shaped to avoid interference with the assemblies being riveted. They are made of heat treated alloy steel bar stock and are simple in form. The power of the air cylinder is multiplied and transmitted to the driving jaws through a hardened and ground alloy steel wedge and anti-friction roller bearings. Operation of the machine is by a foot actuated valve.

Automatic Punch Press Control

AN unusual application of its Capacitrol type, indicating controlling ammeter has been made by *Wheelco Instruments Co.*, Chicago, in the form of a protective device for an automatic punch press producing 100 aluminum stampings per min. The stampings have the tendency to pile up occasionally, resulting in die breakage or springing of the crankshaft. This instrument, ordinarily used for process control work, acts to stop the press before the third piece piles up on the second.

The controlling ammeter is placed in the line to the motor drive of the punch press, and a starting switch bypasses the controller for starting operation. After the motor reaches speed, the switch is thrown to put the motor current through the controller. The motor normally draws 5 amp. and the control setting is usually 6 amp. The trip pin in the clutch is solenoid operated and if the current goes above 6 amp., as when two stampings pile up, the pin is instantly released and the motor cut out simultaneously. There are no mechanical connections, all functions being handled electrically through relays. The instrument itself works on a radio impulse.

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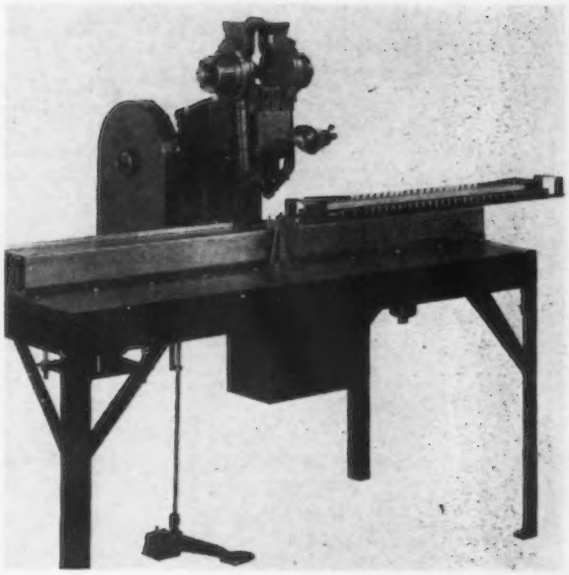
AT RIGHT

WHAT is believed to be the first multiple setter to employ a movable anvil actuated by a solenoid has been developed by the Chicago Rivet & Machine Co., Chicago. Pressure of the operating pedal causes the solenoid to actuate a toggle movement, raising the anvil into clinching position. When clinching is completed, the driver automatically raises and disconnects electrical contact with the solenoid. This causes anvil to drop, permitting moving of assembly fixture to next indexing position. The unit is adaptable for multiple clinching tubular rivets as well as eyelets in line assembly of small parts.



BELOW

SAVINGS in operator's time, greatly increased gaging speeds, and accurate settings are claimed for the front controlled power back gage which the Cincinnati Shaper Co., Cincinnati, now provides as optional equipment on its All Steel shear. Push button control is conveniently located at the operator's position, and dials reading in inches and sixty-fourths or finer are mounted above the finger tip control. A fast forward and a fast backward speed give rapid movement to the desired position, while a spotting button sets the gage accurately.

ABOVE

HANNA high speed pneumatic riveter capable of forming 3/8-in. rivets cold or 1/2-in. rivets hot in a stroke cycle of less than 1 sec.

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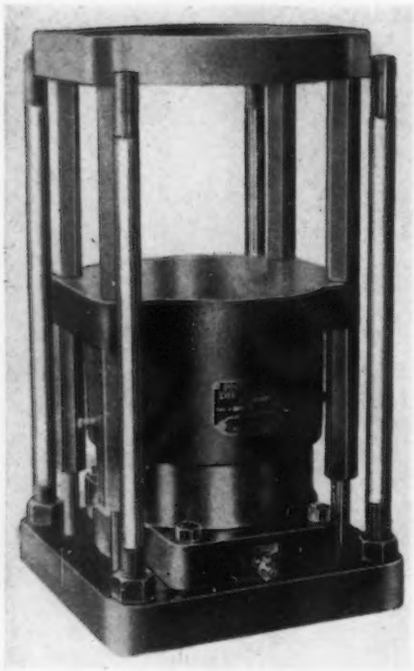
Precision Die Sets

DANLY MACHINE SPECIALTIES, INC., of 2130 South 52nd Avenue, Chicago, announces a new and enlarged line of precision die sets in a wide range of sizes of regular, reverse and long-narrow die sets for any die from 3 x 3 in. to 25 x 14 in., in many thickness combinations of die holder and punch-holder. Included also are a new square series of back post sets for mounting square and round dies, also in a complete range of sizes from 3 x 3 in. to 14 x 14 in.

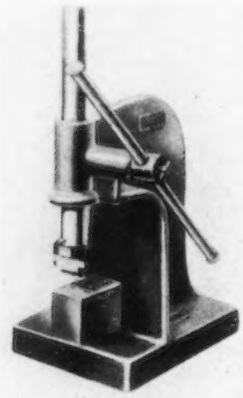
These die sets are assembled with precision guide posts, hardened and lapped to tolerances of ±0.0001 in. Precision bushings of standard, shoulder and extra long types are honed to the same limits. Any die holder or punch-holder of the same center distances will fit with any other die holder or punch-holder of the same dimensions.

Pneumatic Die Cushion

FOR installation on inclinable and straight side presses where it is necessary for the slugs, scrap or blanks to pass through the die proper, the *Dayton Rogers Mfg. Co.*, 2830 South 13th Avenue, Minneapolis, is



DAYTON Rogers model CS pneumatic die cushion is designed with clearance above the die cushion cylinder so as to allow slugs or blanks to fall through the pin pressure pad.



ABOVE

COMBINATION arbor press and Hercules holder with type, made by H. O. Bates, 251 N. Broad Street, Elizabeth, N. J., for stamping name plates or parts with lettering or numbers. Press has a leverage ratio of 50:1 and is capable of stamping 1/8-in. figures in stainless steel plates or the equivalent of four times this impression in aluminum. The anvil block can be furnished with a wider face than illustrated for large name plates or parts. Hercules holders can be furnished for one or more lines of type.

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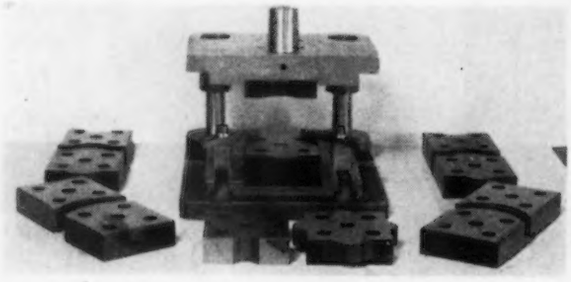
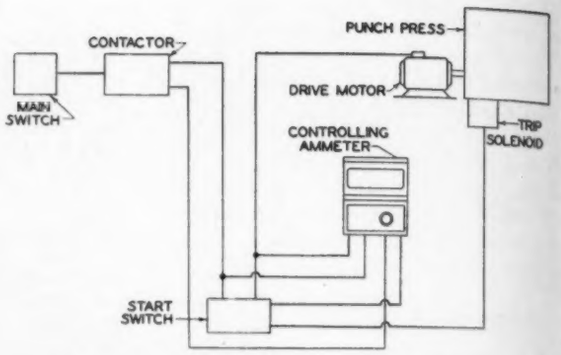
AT RIGHT

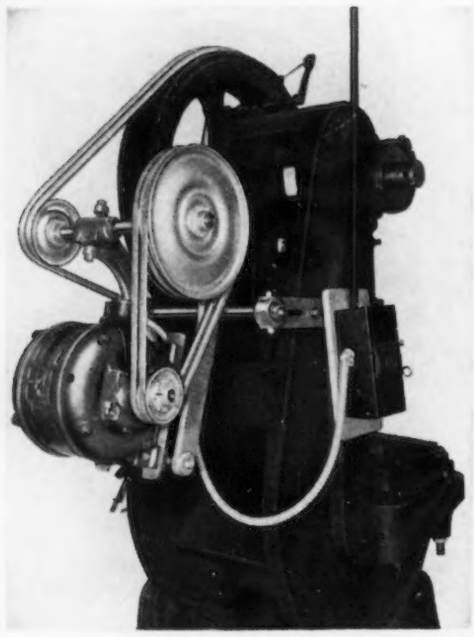
CORNER radius trimming die sets for rounding the corners of square sheared blanks are now being supplied by the Service Machine Co., of Elizabeth, N. J.



AT RIGHT

CIRCUIT diagram showing how a Wheelco controlling ammeter has been hooked up to act as a quick acting overload relay for throwing the clutch of a high speed automatic press out of engagement and stopping the motor, should stampings pile up on one another.





ABOVE

WITH the "Modern" punch press drive announced by the Quality Hardware & Machine Corp., 5841 N. Ravenswood Avenue, Chicago, punch presses and similar machines can be converted to individual motor drives, using standard 1750-r.p.m. motors. Design is such that the weight of the motor is used to maintain tension on the V-belts, the entire assembly pivoting about the central countershaft. Sheaves can be had for the usual speed ranges. Final drive is directly on the flywheel of the press, without grooving.

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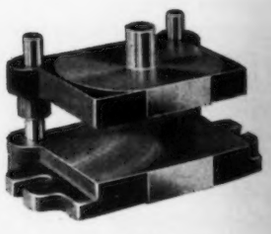

ABOVE

REGULAR, reverse and long-narrow die sets for any die from 3 x 3 in. to 25 x 14 in. are found in the new and enlarged line of Danly precision die sets.

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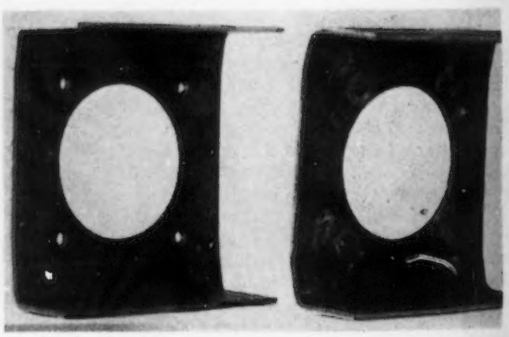


ABOVE

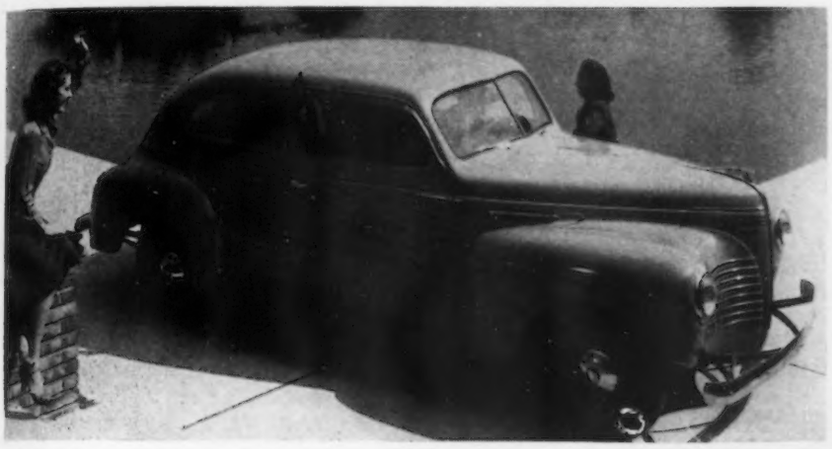
AFTER some experimenting, single-operation dies have been designed and built by the Reliance Electric & Engineering Co., Cleveland, that blank the large lead hole and pierce and extrude the screw holes used in attaching motor conduit boxes to their bases. A second punch press operation with forming dies produces the familiar U-shape of the conduit base (left). After forming, the four extruded screw holes are tapped in a multiple tapping machine. Former practice consisted of blanking the large lead hole, drilling the four screw holes, forming the U, welding nuts on the underside of the conduit base, and re-tapping the nuts to repair the damage to the threads done in the welding operation. The result is shown at right.

offering a new model CS pneumatic die cushion. In this design, the draw ring pressure pins pass through the bolster plate and come to rest on the top of the pin pressure pad, allowing the latter to bump against the under side of the bolster plate. The pin pressure pads can be provided with openings of practically any size within the limit of the cushion for slugs or blank clearance. These openings allow the slugs or blanks to fall through the pin pressure pad, clearing the top of the die cushion cylinder. This design of cushion can also be used on various compound dies for controlling the stripper plate action.

These cushions are now made in five sizes, from 6 to 14 in., progressing by 2 in., having a drawing capacity of from 2 to 6 in. This cushion equipment can be attached directly to the bolster plate or provided with suspension rods for press bed installation.

Corner Radius Trimming Die

TO nip the sharp corners of square sheared blanks and to provide round corners on them, the *Service Machine Co.*, 754 Broadway, Elizabeth, N. J., has developed a utility corner radius trimming die. Pairs of interchangeable trimming blocks are piloted on a large dowel at the center for ease in setting the blocks in place. Radii from ¼ to ⅝ in. are cut on a four-way die block which can be turned 90 deg. to cut different radii. Two-way die blocks are used for ¾ and ⅞ and 1 and 1¼ in. radii, while sizes from 1½ to 2¾ in. are made on pairs of single blocks. The radius is made a little outsquare so as to blend with the sheared edge of the sheet. Upper and lower blocks can be interchanged for notching 90-deg. corner notches having a radius, or a sharp corner notching die can be provided for this work. Special shapes of corner notches can also be furnished.



AT LEFT

ON a longer, 117 in. wheelbase, the 1940 Plymouth Roadking and DeLuxe models are entirely new. Fender designs are particularly striking and are characteristic of this year's general trend. Sealed-beam headlamps are mounted in the fenders. Running boards are optional on all body styles. This is the Roadking two-door Sedan.

BELOW

THE DeSoto four-door DeLuxe Sedan has lines similar to Plymouth—characteristic of the entire Chrysler line. Because the front and rear fenders have similar lines, they are called "duplicating curve" fenders. The new location of the wheels, seats, power plant and body (as indicated in Fig. 2) make possible a full-width rear door with no cut-out around the wheel housing. This is another important Chrysler sales feature.

ABOVE

FOLLOWING much advance talk in the trade, Buick announces an entirely new type of car designated the Series 50 "Super" and the Series 70 "Roadmaster". The bodies are many inches wider; there are no running boards and the room normally required for these is used to seat an extra passenger in the front seat. The cars are a full six-passenger type.

THIS WEEK ON THE ASSEMBLY LINE

By W. F. SHERMAN
Detroit Editor

. . . Auto industry's new model program continuing without interruption . . . Aircraft expansion having effects on Detroit industry and personnel . . . Closed shop demand by UAW-CIO seen as threat to aviation manufacturers.

DETROIT — Programs initiated by peace-time industry are responsible for a major part of the fall business activity in Detroit, notwithstanding the impetus which the European war has added. Production of automobiles, both passenger cars and trucks, has shown steady and substantial increases, with the past week's output far exceeding the assembly totals of a year ago and even the busy year of 1937.

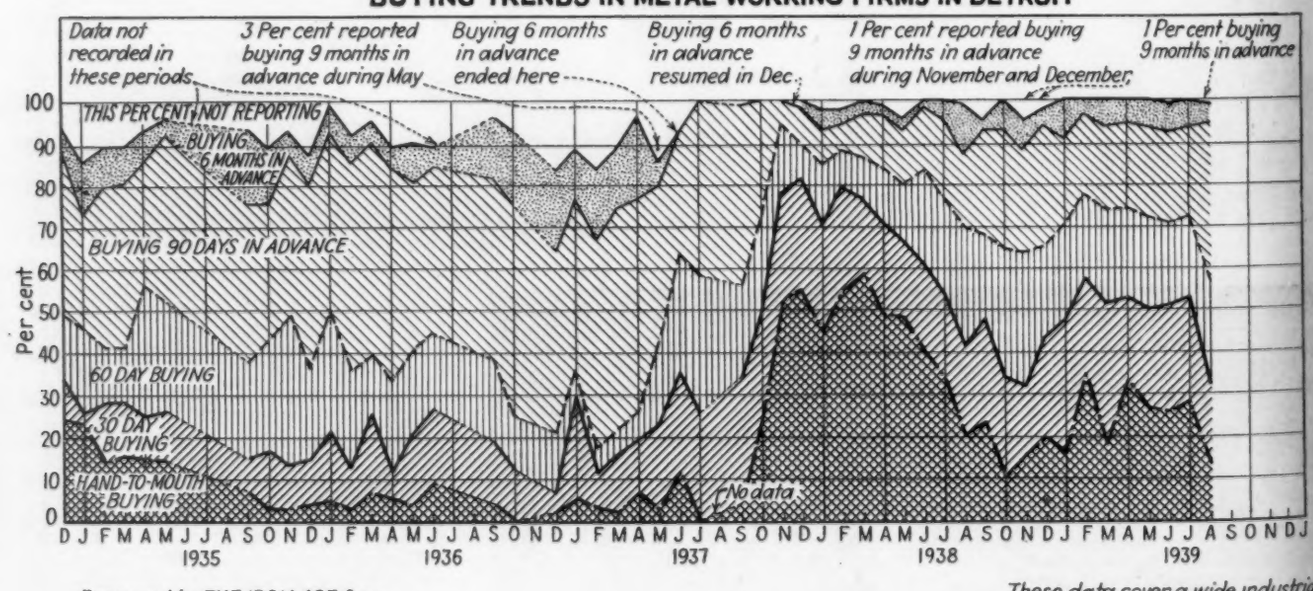
Resumption of Ford production (1600 units turned out) and Chevrolet (first 100 cars built), plus renewed activity in some plants which had been affected by suppliers' strikes, helped to boost motor car production last week to 41,245 units, against 26,865 the previous week and 16,100 in the corresponding week a year ago, according to Ward's Automotive Reports. The industry is engaged in an earlier advance than in 1937, when mid-September saw the low point reached at 28,000 to 30,000. Gains at Chrysler increased totals from 10,425 to 17,925, including 10,625 Plymouths. General Motors turned out 10,825 cars against 7788 a week ago.

Larger Sales Expected in 1940

Leaders of the automobile industry look forward to substantially better volumes of automobile sales in 1940 than in 1939. Increases, they say, will be moderate, about 10 to 15 per cent, but this is what was looked for when fall campaigns were planned in July and August. Export business to Europe has suffered (Page 56, Sept. 7) but it is expected that the industry eventually will find greater markets in South America because of the shutting off of European exports.

Even in the face of war-spurred buying, it is profitable to examine the record which shows the rate of peace-time buying of the automobile industry and other Detroit industries. (See chart). On the basis of generally good prospects in these industries, fall consumption of materials was scheduled at a high rate. It is revealed now in figures released by the Purchasing Agents' Association of Detroit that the August outlook had caused a broad and important increase in forward buying of materials. Under this impetus, hand-to-mouth buying was reduced to half of what it had been in the previous three months and only one-third of what it was in February, when buying was least active. As purchasers expanded their activities, with a larger percentage buying one to two months in advance of requirements.

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT


Data not recorded in these periods
3 Per cent reported buying 9 months in advance during May
Buying 6 months in advance ended here
Buying 6 months in advance resumed in Dec.
1 Per cent reported buying 9 months in advance during November and December
1 Per cent buying 9 months in advance
THIS PER CENT NOT REPORTING
BUYING 6 MONTHS IN ADVANCE
BUYING 90 DAYS IN ADVANCE
60 DAY BUYING
30 DAY BUYING
HAND-TO-MOUTH BUYING
No data
Per cent
100
90
80
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D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J
1935
1936
1937
1938
1939

Prepared by THE IRON AGE from data supplied by PURCHASING AGENTS ASSOCIATION OF DETROIT

These data cover a wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessary and auto plants

DEPENDABILITY
PHILO
BRAND
QUALITY • SERVICE
Ohio Ferro-Alloys Corporation
Canton, Ohio

W. S. KNUDSEN, president of General Motors; C. S. Kettering, vice-president in charge of research, and Harlow H. Curtice, Buick's president, in one of the new Buick cars.

at least 57 per cent of August buying was on a 60-day basis, or better.

As an important indication of the better feeling that existed, 38 per cent of the buyers in the Detroit area, representing a wide variety of industrial consumers, were buying a full three months in advance of production.

With the buying splurge that has gone on since Sept. 5, the purchasing agents' survey for the current month should reveal that hand-to-mouth buying has virtually disappeared, with all buying approaching a quarterly basis at least.

Continuation of normal automotive programs is looked for in most plants, although there have been indications of War Department orders for airplanes, engines, trucks, tractors and even house trailers. Inquiry for more than 100 steel-covered house trailers has been received from the Army by one Detroit firm which has built several experimental models for commercial use. It is explained that the trailers would be assigned to various camps for field office work and would be used for transporting light equipment needed in the camps.

Shortage of Skilled Workers

One of the first effects of expanded aircraft programs felt in Detroit has been a search for experienced engineering and production personnel. A California builder of planes had a representative in Detroit recently looking for 300 draftsmen, engineers and executives. It is estimated that there is immediate requirement for approximately 1000 men in this field. Automobile plants, particularly body drafting divisions, have felt the effects as men experienced with the difficult job of body layout and drafting took up the call.

Allegations that American-made dies for aircraft manufacture had been shipped from Detroit to Canada before the war started are unfounded, according to the best authority in this area. For the most part, it is pointed out, aircraft plants particularly new ones being set up in Canada, are not at the stage where they can use mass production dies. However, the Detroit tool and die industry has seen some of its experienced men called to aircraft centers on the Coast and it is understood here that dies for airplane fabrication are in increasing demand.

Windsor became a focal point Thursday for the recruiting of skilled men and technicians. Orders were received from military district No. 1, London, Ont., to employ 1000 workers within seven days. The city across the river from Detroit is an important mass production center, with numerous automobile and parts companies (or branches of American concerns) established there.

Recently moves have been launched

THE BULL OF THE WOODS — BY J. R. WILLIAMS

TH' VERY IDEAR! WAITIN' ON A BIG THIRTY-TON CRANE TO LIFT A LITTLE THING LIKE THIS INTO YOUR MACHINE WHEN YOU COULD DO IT ALONE! LOOK AT THIS - JUST HOLD THIS END UP AND RUN THAT CENTER IN-- WHY, NOTHIN' TO IT!
I THINK WE'RE JUST IN TIME TO LEND A HAND HERE
YEAH - THAT FELLER CAN'T WATCH HOW TO DO IT ALONE IF HE HAS TO HELP HIM DO IT ALONE
T. M. REG. U. S. PAT. OFF.
COPR. 1939 BY NEA SERVICE, INC.
INDIVIDUALITY
9-15
J.R.WILLIAMS

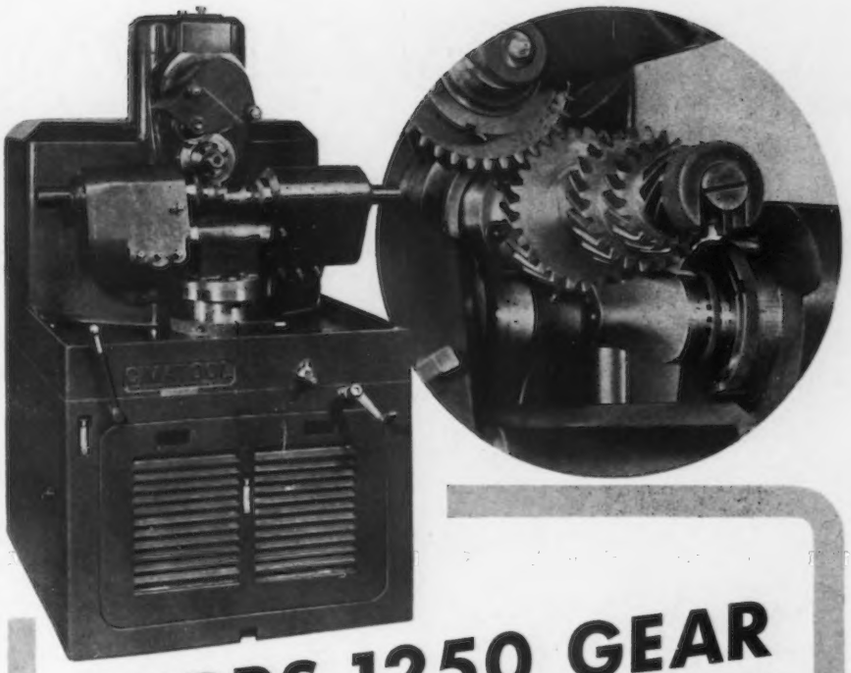
at Detroit and Flint for the establishment of an aviation research laboratory authorized by Congress for the National Advisory Committee for Aeronautics. Each location is being urged as a proper site for the laboratory because of the nearness of automotive laboratories and technical organizations. George C. Patterson, manager of Fisher Body Plant No. 1 at Flint, was leading in the drive to have the NACA research center erected at Flint. Since the aircraft industry has been finding it necessary to seek out men in this area, and because of the inland location, great interest in the proposal is expressed here.

Heavy Steel Purchases

As heavy purchases of steel continued during the last week, at least one major supplier put its district office on a footing where various types of material were allocated by tonnages. However, it is stated that supplies of steel available for Detroit are ample to care for all regular customers. So far there has been no attempt to allocate steel to consumers —the basis of sales being first come, first served—but orders for excessive tonnages are being discouraged. Practically all of the low-priced tonnage purchased during the spring and summer has been specified already. One source of information declared that "several" old customers had asked for protection on deliveries after the first of the year at prices prevailing then. It was stated that insistent demands for such protection were granted. Some consumers were covering only normal immediate demands, however.

It is declared that purchases for Chevrolet cover 425,000 cars. This would indicate that enough material will be on hand to carry this producer well past the first of the year. General Motors in the last week has been a heavy buyer, although for the most part it is indicated that only the requirements through the end of the last quarter are being considered now. Chrysler has been buying also, but so far Ford has not come into the market for steel. It was understood late last week, however, that Ford is preparing a schedule for a buy which might be made this week. Steel for the entire fourth quarter probably will be purchased at this time but Ford representatives do not expect the requirements from sources outside their own mill to greatly exceed 50,000 tons. Although some semi-finished steel is understood to have been allocated for sale in this area,

(CONTINUED ON PAGE 88)



BURRS 1250 GEAR TEETH PER MINUTE

CIMATOOL
No. 200-B
BURRING MACHINE

BY MEANS of a fly cutter on each of two spindles, the Cimatool No. 200-B Burring Machine burrs 1250 teeth per minute. One cutter machines the front of the tooth, while the other machines the rear.

The action, in general, is similar to that of a hobbing machine —the gear revolves continuously as cut. Operation is entirely automatic and includes hydraulic clamping. A solenoid operated instantaneous friction brake stops the machine after a complete cycle, leaving the cutting tools in position for unobstructed unloading of work.

Burring of gear teeth is a necessity to eliminate hazard of crystallization and chipping in service—a vital performance, maintenance and safety measure in high speed service.

Cimatool Gear Burring and Chamfering Machines are made in ten models, which cover almost every requirement in this division of gear processing.

Write for data on your needs.

Cimatool

THE CIMATOOL COMPANY

Dayton, Ohio, U.S.A.

DIEMAKERS • MACHINE TOOLS • TOOL MAKERS

THIS WEEK IN WASHINGTON

. . . Government steel awards for week $5,000,000 . . . Germany reported short of machine tools . . . Railroads ready for heavier traffic . . . War may aid building construction.

o o o

By L. W. MOFFETT
The Iron Age

o o o

WASHINGTON—Reaffirmation of existing prices of steel products for domestic consumption for fourth quarter shipment reflects a general attitude of restraint against price increases and may account for the statement last Friday of President Roosevelt that he does not expect to ask for any anti-profiteering legislation at the special session of Congress, which, at his call, will begin on Thursday of the present week. That the President is satisfied with the present steel price structure was indicated when on Tuesday of last week he said no question had arisen regarding steel since no unusual rise had taken place and none was expected. The only increases that have been made are in export prices which were advanced to the domestic levels. The President's statement that no steel rise was expected was taken by some to indicate that he had foreknowledge of the subsequent reaffirmation of steel prices.

Concerned Over Copper

The President, however, again indicated concern over copper prices when he said that plenty of copper could be produced at 12½c. a lb. with a fair profit and the Government wanted no repetition of the World War situation, when, it was stated, copper rose to 24c. a lb., creating profits which evidently had to be borne by the taxpayers as a group.

But while the President says he does not expect to ask for antiprofiteering legislation at the special session hoping to confine it to neutrality legislation, the Administration already has had Attorney General Murphy draft price-control legislation. Should the Government think prices are getting out of hand this legislation could be dropped immediately in the Congressional hopper. It is evident that even if it is not introduced at the special session, the Administration is depending on the implications of the bill, whose details have not been disclosed, to act as a club against unduly increased prices. The Attorney General did say, however, that the legislation has been drafted with a view to avoiding mistakes made in the 1917 food control act which because of its general terms relating to price fixing was held unconstitutional by the Supreme Court in 1921. The Attorney General indicated that the legislation he has prepared does not attempt to fix prices but would delegate authority to the President to control prices within a certain range.

Object to Help Business

"What we have had in mind," he said, "has been to help economic laws to function in cases where they have been hindered. Our object is to help business recovery, not to thwart it."

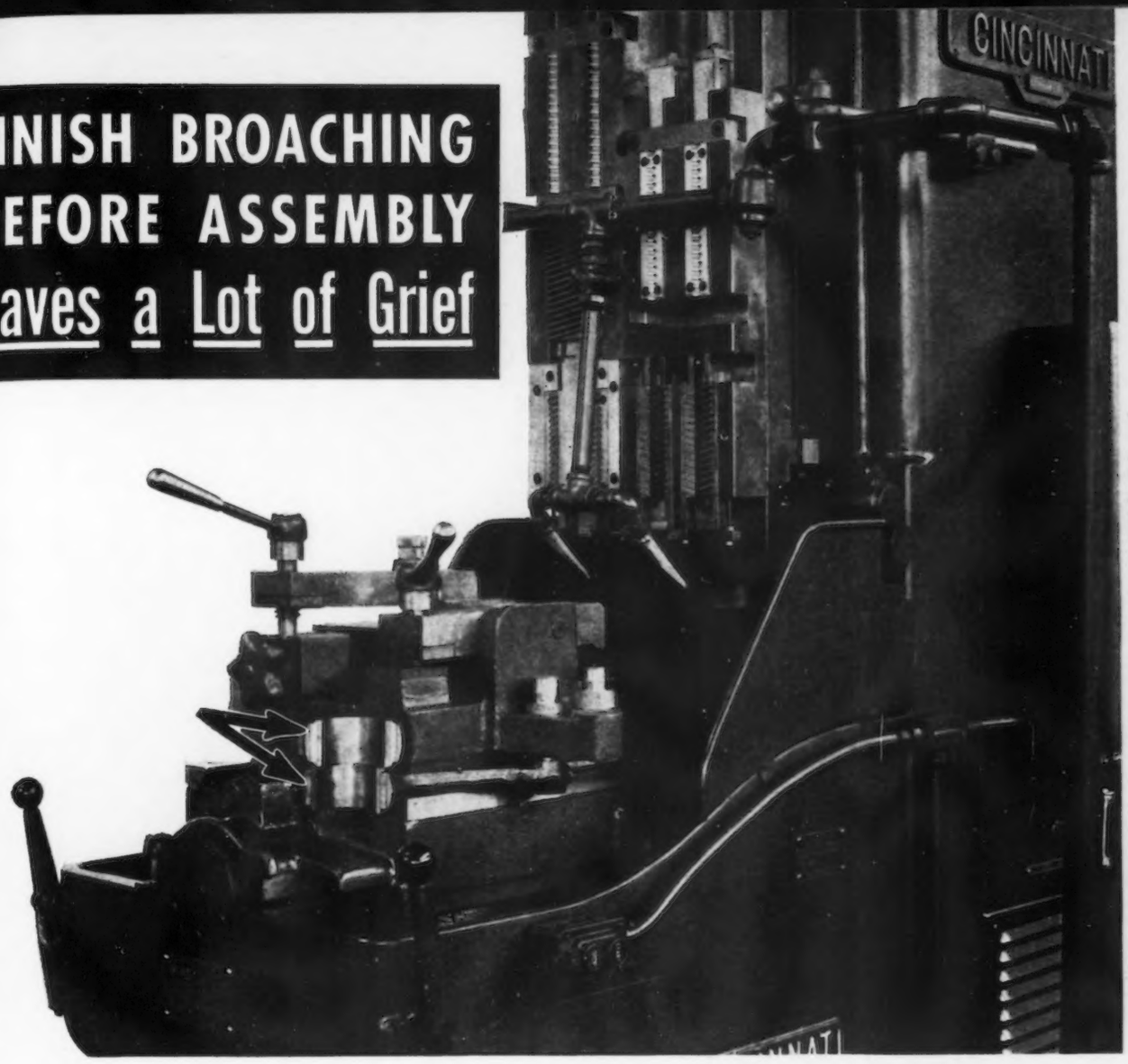
The intimation is that, if not submitted at the special session, the measure will be offered at the regular session beginning in January. There is, however, in some quarters the belief that legislative peace-time-control may be threatened only as a restraint against so-called profiteering prices and not actually undertaken. It may well be that this is a false surmise and that the New Deal is in earnest in proposing such legislation, and is confident it cannot be defeated on claims that advantage will be taken of present conditions to bring about permanent regimentation. It goes without saying that should the United States become involved in hostilities legislation for widespread and tight Government economic control would be quickly enacted.

Meantime, the Administration is depending on "moral pressure" as well as legal power to curb price increases. In the former direction the Administration appealed to retail stores to help stop buying waves that followed the outbreak of the war in Europe and set food prices soaring. He expressed gratification of the response from retailers who joined the Administration in assuring the public that there is and will not be a food shortage. To halt rising prices of sugar the President boosted import quotas. Another curb is the threat of anti-trust prosecution. Attorney General Murphy has announced that the Anti-Trust Division is making studies of "possible collusive profiteering." Assistant Attorney General Arnold has said that he will ask Congress for increased funds to carry on the work of the Anti-Trust Division in his campaign to prevent "the other fellow's war from distorting our economy." Acting under orders of the Attorney General, Mr. Arnold said the division will work with the War and Navy Departments, Department of Commerce, Department of Agriculture, Treasury Department and the War Resources Board.

Upswing May Bring Action

Dividing discussion of prices into two phases, the President said profiteering must be approached from different viewpoints as between production and retailing. With a halt on retail prices and the general restraint of industry against raising prices, the Administration apparently feels that its strategy makes control legislation unnecessary at this time. Should there develop an upsurge of prices, however, which it felt was not justified it may well be that the Administration would attempt to reinforce its existing machinery by asking for legislation at the special session. Already there are arguments being made that it is not sufficient to broadly break study of prices into two phases, retailing and production, but that study of production should be divided into two classes, raw materials and manufactured commodities. In this connection attention has been directed to the fact that there have been rises in prices of raw materials while prices on their products remain unchanged, of which steel is an example. It has been pointed out that it cannot be expected that once present inventories of their raw materials are exhausted, the steel industry particularly non-integrated units, can

FINISH BROACHING BEFORE ASSEMBLY Saves a Lot of Grief



CINCINNATI

A SYMBOL OF A DEFINITE STANDARD OF WORTH

FINISH broaching operations sometimes save a lot of grief in assembling accurately fitted parts, particularly when the finishing operation precedes assembling. For example, the tractor connecting rod and cap on the table of the machine shown above—a CINCINNATI No. 5-42 Single Ram Vertical Hydro-Broach—illustrate the point.

These parts are rough broached complete on another machine, and then after all but one of the remaining operations are completed, the parting face, key and keyway are finish broached, removing only about .010" stock. With this method, there's no doubt about the flatness of the parting face, or the accuracy of fit between the key and keyways.

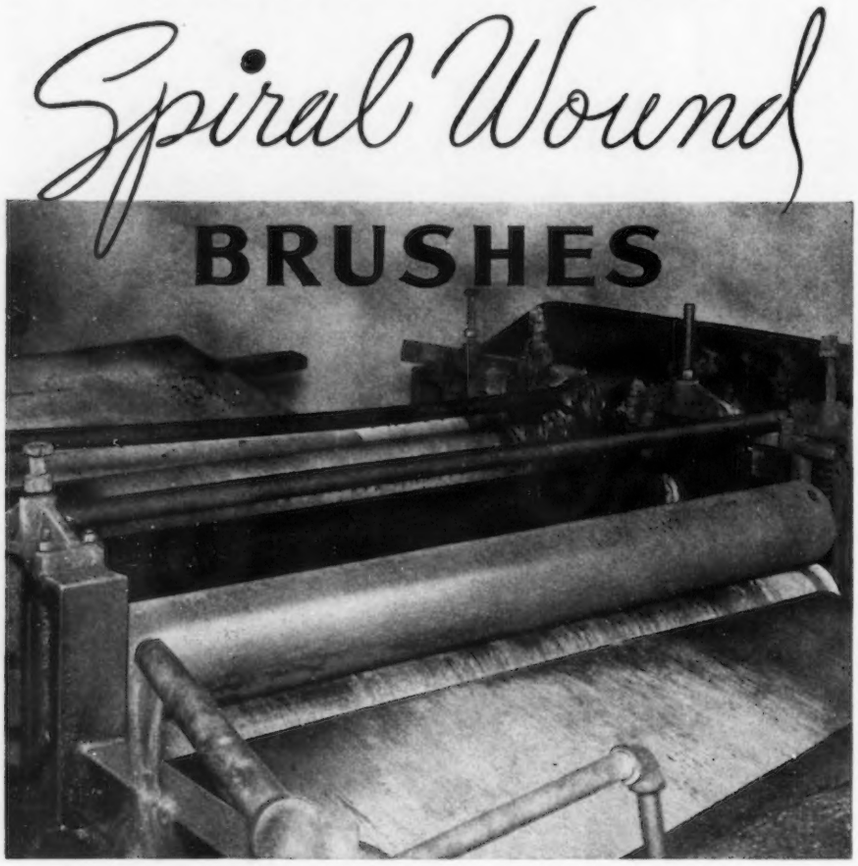
One cap and one rod are finish broached during each cycle of the ram at a production rate of 133 sets (266 parts) per hour.

An exclusive latch device which always returns the receding table to its exact broaching position has much to do with the close accuracy obtainable. Among the other important features of these machines are the hardened and renewable ways. Catalog M-834 tells the whole story. Write for a copy.

THE CINCINNATI MILLING MACHINE CO.
Cincinnati, Ohio, U. S. A.

"EVEN TRIM"

Spiral Wound BRUSHES



—Step Up Production

—Cut Finishing Costs

—Insure A Better Profit

TURN to "Even Trim" Spiral Wound Brushes and obtain uninterrupted production and a smoother, better finish for light gauge steel and continuous strip tin plate.

Spiral Wound Brushes are made of nickel-steel wire, horsehair or tampico. There's a type for every wanted finish. And for economy and efficiency they're *refillable.*

Let one of our engineering representatives work out the Spiral Wound Brushes for your specific needs. Write or telephone—today.

PITTSBURGH
PLATE GLASS COMPANY
BRUSH DIVISION · BALTIMORE, MD.

acquire raw materials at higher levels without increasing prices.

But if the President adheres to his announced purpose of asking only for neutrality legislation at the special session, the Administration will forego any move toward legislative price control. It is obvious that once in session Congress will not confine its activities toward neutrality legislation but will at least discuss, if not legislate, on a wide variety of subjects. And it may well be that it will remain in session up to the Christmas holidays. For one thing Congress, reflecting a strong public sentiment wants to sit on the lid and to check the Administration in any moves, no matter how well intended, which Congress may feel will involve the United States in war.

Fight Over Neutrality

The stage is set for a bitter fight over neutrality legislation. The prevailing view is that the President will be successful in having the arms embargo act repealed.

But revision of the neutrality act will come only after a stiff struggle in the Senate, possibly lasting several weeks. Present indications are that there will be no substantial resistance in the House. In the Senate it may well be expected that vigorous but unsuccessful efforts will be made to broaden the embargo act to include such supplies as iron and steel, machinery, iron and steel scrap, oil, etc., which constitute vital war requirements. Also it is likely that renewed but unavailing efforts will be made simply to shut off American scrap supplies to Japan.

Navy Supplies Bureau Awards

WASHINGTON — Contracts have been awarded by the Bureau of Supplies and Accounts, Navy Department, as follows: The La Pointe Machine Tool Co., Hudson, Mass., broaching machine and equipment, $5,429; Lidgerwood Mfg. Co., Elizabeth, N. J., winches, spare parts, tools and wrenches, $41,886; Chicago Pneumatic Tool Co. Philadelphia, pneumatic wrenches, $6,240; Racine Tool & Machine Co., Racine, Wis., hacksaws, $5,161; Pratt & Whitney, Division of Niles-Bement-Pond Co., Hartford, grinder, gear, and equipment, $8,928; Pennsylvania Forge Corp., Philadelphia, propeller shafts, $27,790; Northern Pump Co., Minneapolis, pumps, spare parts special tools and wrenches $16,094; and the Bethlehem Steel Co., Bethlehem, Pa., steel forgings $34,110.

Railroads Are Ready, Association Says

WASHINGTON — The Association of American Railroads is sticking by its guns in maintaining that the railroads "can and will meet any anticipated demands for transportation." This stand was unanimously reiterated last Friday following a meeting of the association's board which met to consider business prospects and the transportation.

President Pelley of the association authorized the statement that the railroads are at work now on necessary repairs to cars and locomotives. He said that as need develops for additional equipment, it will be available. Further consideration was given to the business and transportation situation at a meeting here of member roads of the association. There has been a warm dispute over the state of preparedness of American railroads in the event of national emergency.

Meanwhile a special advisory committee, headed by former Assistant Secretary of War Benedict Crowell, at a meeting last Friday endorsed the War Department's industrial mobilization plans. Reviewing the Army's program for educational orders, approval was given to both the procedure and the list of projects proposed, with the exception of the Air Corps.

Secretary of War Johnson said some uncertainty existed among the committee on this subject and that members preferred to withhold recommendation until further information is available.

The educational order program provides for an expenditure of $14,250,000 during the fiscal year 1940.

NLRB Orders Election in New Jersey Foundry

WASHINGTON—The National Labor Relations Board last Thursday directed that an election be held within 15 days among production and maintenance employees of the Florence Pipe Foundry & Machine Co., Florence, N. J., to determine whether they desire to be represented by Lodge 2040, Amalgamated Association of Iron, Steel & Tin Workers of North America (CIO), by Local No. 12 of the International Molders Union of North America (AFL), or by neither.

The board has ordered the Ohio Brass Co., Mansfield, Ohio, to "stop interfering" with its employees' rights to self-organization and collective bargaining through representatives of

SEE THE
6 FARREL ROLL GRINDERS
AT THE
New IRVIN WORKS

When You Go to the Iron and Steel Show

In operation at the new Irvin Works of the Carnegie-Illinois Steel Corporation are six Farrel Heavy Duty Roll Grinders. When you tour this plant during the Iron and Steel Engineers' inspection trip make it a point to watch them in operation.

Note the speed and accuracy with which these roll grinders produce rolls of high precision and fine finish. Observe how they grind perfect surfaces free from all marks, with either straight, concave or convex contours of exact symmetry. They take, with equal facility, heavy cuts for rough grinding or apply the finest mirror finish. Notice, too, their smooth, vibrationless operation.

The Farrel Roll Grinder is a production and precision machine, a combination which means high output with high roll quality at low cost.

Visit
FARREL BOOTH
No. 71
IRON & STEEL EXPOSITION
PITTSBURGH
September 26-29, 1939

Farrel engineers will be at Booth 71 to answer questions and give details of the construction and operation of Farrel Heavy Duty Roll Grinders, the Farrel Gear Units which drive the 84" three-stand tandem cold reduction mill at the Irvin Works, and other Farrel rolling mill equipment. You are cordially invited to visit Booth 71.

FARREL
FARREL-BIRMINGHAM COMPANY, Inc.
ANSONIA, CONN.
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their own choosing. The company was ordered to post notices for 60 days stating that it would cease the unfair labor practices found by the Board to have been committed. The complaint of United Electrical, Radio & Machine Workers of America (CIO), was dismissed insofar as it alleged that the company discharged an employee in violation of the National Labor Relations Act.

The board has petitioned the United States Circuit Court of Appeals for the Sixth Circuit, Cincinnati, to enforce its decision and order of Aug. 9 in the case of Ford Motor Co., Highland Park and Dearborn, Mich. The company was ordered by the Board "to cease discouraging membership in International Union, United Automobile Workers of America (CIO), or any other labor organization by discharging, refusing to reinstate, threatening or assaulting their employees." The board further directed that the company "cease disseminating among its employees statements or propaganda criticizing labor organizations or advising its employees not to join such organizations."

Government Steel Awards

WASHINGTON — Government iron and steel contracts reported during the week ended Sept. 9 totaled $4,935,698.35, according to the Division of Public Contracts, Department of Labor. Other awards were: Machinery, $526,786.51 and non-ferrous metals and alloys, $103,756.99. Details follow:

Iron and Steel Products

Pittsburgh Screw & Bolt Corp., Pittsburgh, Navy S & A, bolts and nuts	$16,658.34
A. Finkl & Sons Co., Chicago, War Ordnance, steel forgings	11,648.00
American Safety Razor Corp., Brooklyn, War Q M C, safety razors	10,850.00
Carnegie-Illinois Steel Corp., Washington, D. C., Navy S & A, steel, bar	Indefinite
Carnegie-Illinois Steel Corp., Pittsburgh, Navy S & A, plates, steel	4,702,240.80
Surface Combustion Corp., Toledo, Navy S & A, furnace, annealing	26,784.00
Foster-Wheeler Corp., New York, War Engineer, boilers	64,995.00
MacWhyte Co., Kenosha, Wis., War Engineer, steel strand	15,810.12
Standard Pressed Steel Co., Jenkintown, Pa., War Ordnance, percussion primer components	28,666.09
The Powerlite Switchboard Co., Cleveland, Civil Aero Authority, cabinets	12,800.00
Tyson Roller Bearing Corp., Massillon, Ohio, Washington Navy Yard, roller bearings	10,296.00
Air Cruisers, Inc., Clifton, N. J., War Air Corps, cylinder assemblies	34,950.00

Non-Ferrous Metals and Alloys

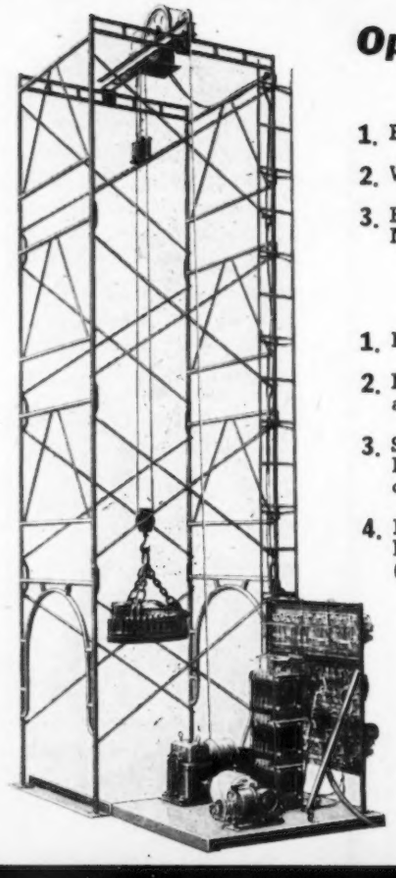
Scovill Mfg. Co., Waterbury Conn., War Ordnance, brass tubing	$23,428.15
The International Nickel Co., Inc., New York City, Washington Navy Yard, nickel, electrolytic	24,487.50
The American Brass Co., Waterbury, Conn., Navy S & A, copper, sheet, angles, brass	55,841.34

Other Machinery

York Ice Machinery Corp., Philadelphia, Navy S & A, plants, air conditioning	$62,852.16
Caterpillar Tractor Co., Peoria, Ill., War Ordnance, tractors	137,456.95
Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., War Ordnance, gear cutting machine	15,730.00
The National Acme Co., Cleveland, War Ordnance, screw machine	13,206.00
The E. L. Essley Machinery Co., Chicago, War Ordnance, honing equipment	21,516.68
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, War Ordnance, milling machines	69,593.10
Kearney & Trecker Corp., Milwaukee, War Ordnance, milling machines	106,735.40
James M. Motley & Co., Inc., New York City, Navy S & A, drop hammers	16,657.00
The Bullard Co., Bridgeport, Conn., Navy S & A, boring mill	11,631.90
M. T. Davidson Co., Brooklyn, Navy S & A, pumps	56,917.32
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich., Panama Canal, electric crane	14,490.00

EC&M Announces—

DYNAMIC LOWERING CONTROL for A-C CRANE HOISTS



Operate your A-C Cranes now

1. By dynamic braking
2. Without mechanical load-brake
3. By standard sequence of operation of Master Switch

and obtain

1. Precision inching
2. Elimination of load-brake maintenance
3. Simple master switch control—both lowering and hoisting motions start on first point of master
4. Increased crane output by lowering heavy loads at hyper-synchronous (150%) speed

This Test-Hoist, complete with motor, controller, etc., will be in operation at Pittsburgh. Various loads will be available to demonstrate actual working conditions found in foundry, freight-handling, warehouse, dock, magnet and similar crane-service.

Examine and operate this outstanding Control at IRON & STEEL SHOW PITTSBURGH, Sept. 26 to 29

Canadian Industry to Be Greatly Stimulated by War

TORONTO—Canadian steel interests still are looking for a solution to the situation that has developed with regard to prices and appear to be afraid to make a definite move until the Federal Government has made known its plans regarding the iron and steel industry and its part to be played in the supplying of munitions and war essentials. The Government's announcement regarding profiteering is acting as a deterrent of rising prices. So far, however, the Government has made no definite announcement and bookings of iron and steel have been very heavy. At the time Canada declared war announcement was made that this country's participation would be more along lines of providing munitions, armament, etc., as well as general war supplies, rather than man power, but so far this has not been clarified and industry as a whole does not know what is before it.

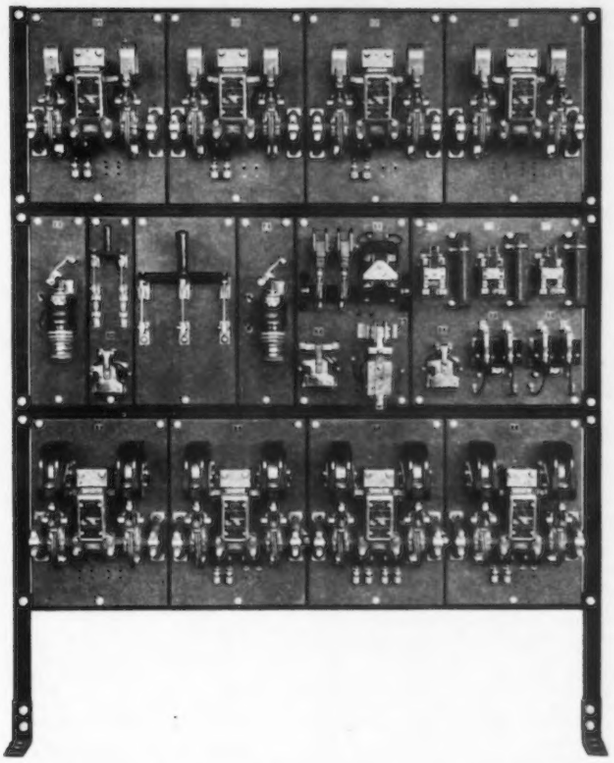
Announcement was made Saturday that the Canadian Government will prohibit the export of capital from this country. It is understood that this will have direct bearing on Canadians trading in United States stocks and securities as well as the sending of money out of the country for speculating in United States funds which have been at a premium of around 10 per cent recently. It is not believed, however, that this measure will affect Canadian purchases of iron and steel and other materials in the United States.

Word from Ottawa is to the effect that the emergency session of the Federal Cabinet adjourned without any announcement from Prime Minister Mackenzie King, but from other sources it is learned that many Canadian industries are being rapidly expanded to handle war orders and the various boards that will hand out contracts are being besieged by representatives of a great many companies for war orders. To date, however, no announcement has been forthcoming regarding actual awards. It is stated that as fast as possible the Canadian Government is preparing to place orders totaling $150,000,000 and at least double this sum can be expected from the British Government. If the war is prolonged, these orders will be greatly increased.

Immediate expansion is contemplated by the six Canadian companies which have undertaken to deliver war planes to the British Government. These plants are located at Toronto, Montreal, Ottawa, Hamilton, Fort William and Vancouver. In addition a number of other plants are under construction and are rapidly being made ready for production. All companies able to produce munitions and supplies are preparing to work night and day to fill demands. A tremendous increase in business and employment in Canada can be expected.

Gordon W. Scott, former Provincial Treasurer for Quebec, has been appointed special adviser to J. L. Ralston, Minister of Finance, and it is understood that he will be closely associated with the new War Supply Board, and possibly become chairman. The British Mission, which will work

This is a typical EC&M Dynamic Lowering Controller for Hoist Motion of A-C Crane



At last—perfected crane control for A-C motor driven hoists, developed by EC&M, the originators of dynamic braking control for D-C cranes in 1912. Now—it is also possible to operate A-C cranes by dynamic braking, permitting low cost and precise operation. With this control, there is no mechanical load brake to wear and require attention; instead, the load is raised and lowered directly by the motor and control using A-C power only.

In inching operations, the short movements of the crane hook possible with this control will surprise you. And when lowering heavy over-hauling loads, the use of hyper-synchronous speeds (as much as 50% faster than previously obtained) will materially increase the output of a crane.

Make it a point to examine this revolutionary control at the Iron and Steel Exposition. If you can't attend this show arrange to operate this control at the EC&M factory, Cleveland, Ohio, where it will be set up a few days after the show closes.

THE ELECTRIC CONTROLLER & MFG. CO. E C & M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

in conjunction with the Canadian War Supply Board, has arrived in Canada and consists of Vice-Admiral Percy Addison from the Admiralty, Major General R. F. Lock, of the War Office, and three representatives of the Ministry of Supply.

Heavy Railroad Buying

Word from Ottawa is that the Canadian National Railways and the Canadian Pacific Railways will place orders at once aggregating about $25,000,000. Formerly it was proposed to introduce a bill at the special session of Parliament to provide the Canadian National Railways with $30,000,000 for new equipment to be spread over the period until March 31, 1941, but this has been changed and immediate orders for the two railroads totaling $25,000,000 will be placed. The orders will be for freight cars and locomotives.

While there has been comparatively little business placed with Canadian steel interests to date for war materials, outside the large contracts awarded at the beginning of the year, a very heavy demand has sprung up for finished and semi-finished materials for peace-time operations. According to local steel interests, the larger producers of sheets have accepted orders covering production to the end of the year and as they are not accepting bookings beyond this period have withdrawn from the market. Bars also have come into heavy demand and some of the mills report full bookings for the year and are accepting orders for delivery at their convenience. American steel producers with offices here have placed a tonnage limit on new business.

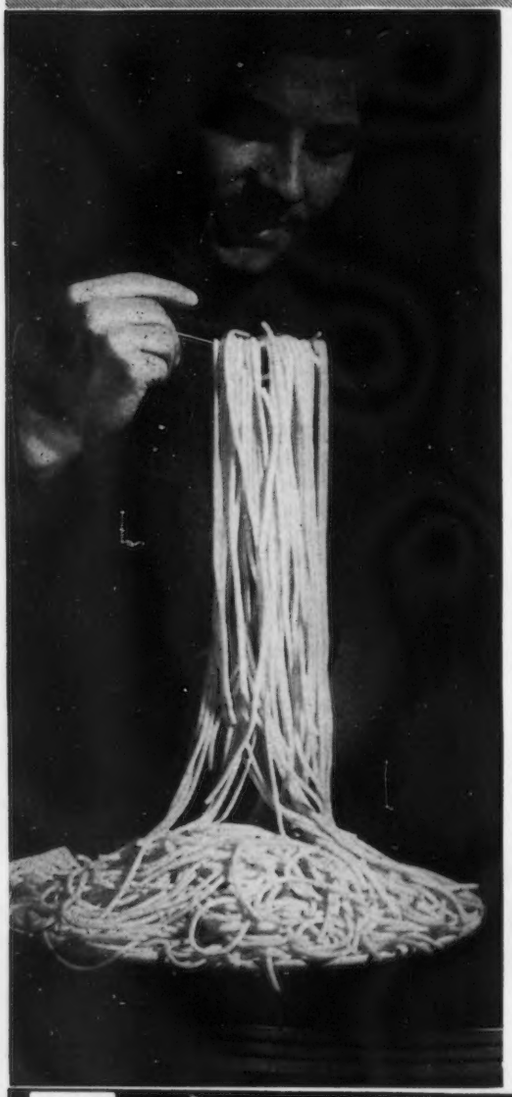
Interest in Neutrality Act

Considerable interest centers around what the Roosevelt Government may do with regard to the Neutrality Act when Congress meets next Thursday. Many reports are heard locally that if the Neutrality Act is not changed at least in sufficient measure to enable purchases by Canada and Great Britain, there may be a rush of American plants to this side of the border for participation in the production of munitions and armaments. Representatives of some United States companies are said to have been in Toronto during the past week looking over sites for contemplated plants. Canadian interests also are making every preparation for extensive production of shells, armament and munitions and extensive purchases of machine tools and general equipment have been made recently and others are seeking equipment. In recent years, however, there has been a concerted drive on the part of many companies towards replacing obsolete and worn out tools with modern high speed equipment with the result that a great many plants now are equipped to handle war contracts as they are received.

Heavy booking for fourth quarter delivery featured business in the pig iron markets for the past week or ten days, with orders taken at unchanged prices. Blast furnace representatives state that no change in prices has been made here despite the fact that United States quotations on iron are up $2 a ton. So far there has been no shortage of merchant iron and only half of Canada's blast furnace capacity is being used.

Western Machinery Co., whose main office is located in Sacramento, Cal., has been appointed western sales agent for the Productive Equipment Corp., Chicago. L. D. Peik, 421 N.B.C. Building, Cleveland, has been named sales representative for the northern Ohio and Buffalo area.

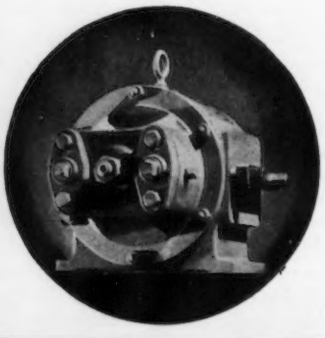
FLEXIBILITY



HELE-SHAW
Fluid Power
HAS IT!

You know how flexible spaghetti is! Well, a few strands of it will give you a good idea of the flexibility of locating a Hele-Shaw Pump . . . for this reason . . . you can mount a Hele-Shaw Pump anywhere you please—on the side, top or end of the machine you are driving, alongside it or hundreds of feet away. Fluid Power from the Hele-Shaw Pump is carried by pipes over or around any corners or obstructions. The flexibility of locating Hele-Shaw Pumps is one of many practical, usable advantages of Hele-Shaw Fluid Power well worth looking into. Ask us to show you how we can put Hele-Shaw Fluid Power (oil under pressure for driving machines) to work for you.

Other A-E-CO Products: Lo-Hed Hoists, Taylor Stokers, Marine Deck Auxiliaries.



A-E-CO Hele-Shaw FLUID POWER

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

Covered Wagon Co. Has New Welding Division

CREATION of a new metal welding division and consolidation of machine shop activities in the main plant has been announced by Covered Wagon Co., Mount Clemens, Mich., trailer coach manufacturer. The new division was established to fabricate the wider trailer chassis frames of 1940 models, A. G. Sherman, president, said. Complete facilities for manufacturing chassis frames on special pattern forms, for welding and riveting, and for construction of all metal parts used in Covered Wagon trailers have now been consolidated in the new division. Uniform mass production methods will provide more efficient manufacturing processes, Mr. Sherman said.

CIO-AFL Strike at Bendix Plant Settled; No Closed Shop

SOUTH BEND, IND.—The recent strike at the plant of the Bendix Aviation Corp. here, which caused suspension of work last week at the Nash, Packard and other automobile plants because of lack of brakes and other parts supplied by Bendix, has been settled. The new contract, ratified by the CIO-AFL membership at the plant, replaces one written late in 1936 and establishes shop rules covering seniority and other details. A number of wage minimums are readjusted, but no general wage advance is stipulated. The main gain to the union is a week's vacation with pay for most workers. The union continues as exclusive bargaining agent, but a closed or union shop is not granted.

Consumption of Scrap In August up 14%

DOMESTIC consumption of iron and steel scrap in August totaled 2,919,000 gross tons, compared with 2,551,000 tons in July and 1,953,000 tons in August, 1938, according to the Institute of Scrap Iron and Steel, Inc., New York. August consumption thus was 14 per cent higher than July, and 49 per cent over last August.

In the first eight months of this year, domestic consumption has aggregated 19,920,000 tons, an increase of 69 per cent over the 11,774,000 tons used in the comparable period of 1938.

Export of scrap in the first seven months, at 2,139,018 tons, was up 12 per cent over the 1,906,038 tons shipped abroad in the first seven months of 1938.

Syracuse Purchasing Agents Exhibit Opens Sept. 27

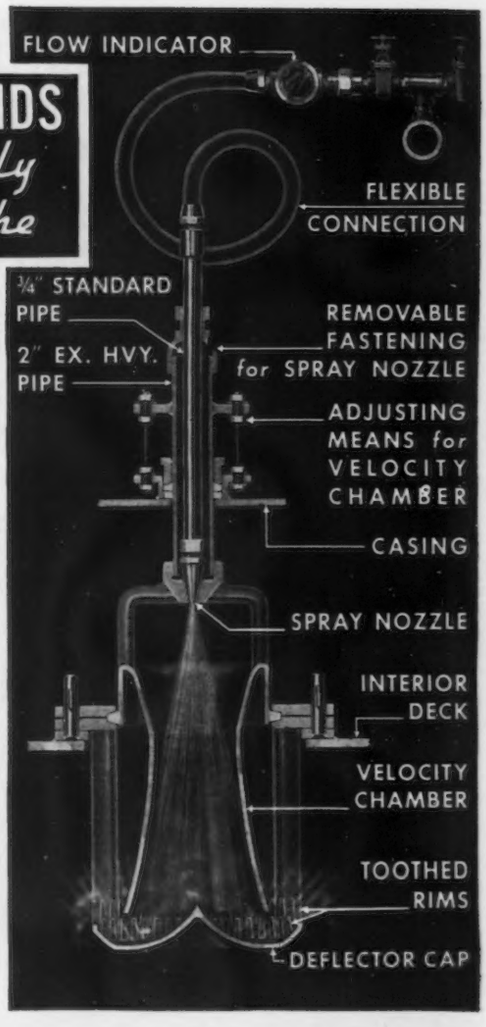
THE Purchasing Agents Association of Syracuse and central New York will hold its 15th annual Industrial Products Exhibit Sept. 27-28-29, at Hotel Onondaga, Syracuse. The exhibit will open with a preview dinner Sept. 27 to which purchasing agents, associates, and exhibitors have been invited. The exhibit is under the direction of M. E. Jennings, Selflock Screw Products Co., assisted by C. J. Kuckhoff, Syracuse Stamping Co., L. A. Saunders, New Process Gear Corp., A. D. Hanley, Bliss Steel Products, C. King, Easy Washing Machine Corp., and F. J. Quinn.

National Pays 40c. Dividend

National Steel Corp. has declared a dividend of 40c. a share for the third quarter. The dividend will be payable Sept. 30, to stockholders of record Sept. 20.

GASES *and* LIQUIDS *are efficiently contacted by the*

BRASSERT STATIONARY DISINTEGRATOR



A compact unit utilizing the principle of high-velocity impingement, the Brassert Stationary Disintegrator is adapted to the accurate control of intimate contact between liquids and gases or vapors. First perfected for washing gas in the steel industry, it has many applications in other processes, such as fractionation, distillation, heat exchange and absorption.

The Brassert Stationary Disintegrator will operate in either vertical or horizontal position. To suit any particular application, the volume, pressure and velocity of the liquid and the velocity and pressure loss of the gas may be adjusted to secure the maximum amount of contact with a minimum amount of operating power. For full particulars, write for Bulletin S1. Address our Chicago or Pittsburgh offices.

H. A. BRASSERT & COMPANY
ENGINEERS AND CONTRACTORS FOR THE IRON & STEEL INDUSTRY
310 South Michigan Avenue, CHICAGO, ILLINOIS
436 Seventh Avenue, PITTSBURGH, PENNA.

Germany Has Taken Most of Poland's Iron and Steel Industry

EDITOR'S NOTE: *The following from the German correspondent of* THE IRON AGE *is the first mail that has come to this publication from Germany since the outbreak of war. The letter was dated Sept. 4, one day after Great Britain and France entered the war.*

HAMBURG, Germany — German steel production in July (26 working days) was 2,106,336 tons as compared with 2,105,682 tons in June (also 26 working days). Out of the total 861,924 tons represented Thomas steel, 88,594 tons crucible and electric steel, 81,137 tons cast steel and the rest was open hearth steel, of which 14,260 tons acid.

Following the German-Russian trade agreement it is learned that the machinery equipment of the steel works is growing more and more obsolete. The purchases Russia will effect in Germany can be only a small proportion of the actual demand. It is particularly learned that the Dscherschinski steel works are obsolete and that the costs of production have risen per ton by 10.5 per cent compared with last year.

The total demand for foreign metallurgical machinery and equipment is estimated to be: (a) urgent about 138 million dollars, (b) not urgent but necessary within a short period 220 to 250 million dollars. These sums include construction of four new blast furnaces, complete equipment of five steel works and of more than 200 industrial plants, as well as equipment of over 90 coal mines and coke plants with more modern machinery.

In the first three days of the war German troops had taken possession of the East Silesian and Teschen coal, iron, steel, zinc and lead production, including all Polish iron mines, thus improving very much the supply position of Germany.

The output of the Polish works occupied by Germany in the first three days of the war has been averaging 135,000 tons of iron, 160,000 tons of steel, 270,000 tons of ores, 7000 tons of zinc, and 3000 tons of lead per month.

ANNOUNCING
the NEW
CINCINNATI BICKFORD
Super Service
JIG BORING MACHINE
For Tool Room and for Small Lot Production
FEATURES
1. Massive frame with broad solid bed.
2. Wide bearings and long narrow gibbed guides for saddle, table and sliding head.
3. Table never overhangs saddle nor does saddle at extreme position overhang base.
4. 12 spindle speeds, and 9 power feeds down and up.
5. Single direct reading lever controls speeds or feeds.
6. 3 H. P. motor for efficient metal removal.
7. Hardened and ground screws.
8. 8" diameter dials graduated in thousandths.
9. Fine adjustment wheel for accurate table setting — one turn equals .020".
10. High precision with or without gauge rods and dial indicators.
Many Other Features
CINCINNATI BICKFORD SUPER SERVICE
See this machine at the Cleveland Show, Booth No. 5610.
Write for Bulletin U-26.
THE CINCINNATI BICKFORD TOOL CO.
OAKLEY · CINCINNATI · OHIO · U. S. A.

Steel Purchases Now Must Be Licensed In Great Britain

WASHINGTON — Brought about by war, the British iron and steel industry has been placed under a licensing system. Control of the industry passed to the Ministry of Supply on Sept. 1, according to a cable received by the Metals and Minerals Division, Department of Commerce, from the American embassy in London. Purchases of iron and steel, with certain exceptions, now can be made in the British Isles only under license.

Steel under contracts closed prior to Sept. 1 and purchases in quantities not exceeding one-half ton are exempted from licensing, but even so may be subjected to the operation of certain "priorities." Government departments, purchasers needing supplies for civil defense purposes, and certain shipbuilding, railroad and coal

mining enterprises are included in the main classes of first priority users.

Determination of relative degrees of priority particularly between orders placed by various government departments is, according to the British press, occasioning more difficulty than is the allotment of available supplies between private and government contracts. The iron and steel industry, however, is cooperating with the government in evolving a definite system of or basis for these priorities with this facilitated by the fact that the industry even before the outbreak of war set up its own system of voluntary priorities to which the majority of producers adhered.

Maximum prices are reported also to have been established for the principal iron and steel products. Prices already scheduled are those which were current in the industry at the outbreak of war and, according to the best information available, will remain unchanged until Oct. 31 next.

At the present time no licenses are required for domestic dealing in scrap iron and steel, but they must be secured from the Export Licensing Department of the Board of Trade prior to the exportation of scrap or certain iron and steel products.

Germany Short of Machine Tools

WASHINGTON — Standardization of the bulk of machine tools manufactured for domestic use in Germany in order to relieve the enormous pressure of that country's machine-tool industry is now under consideration, according to a report from Consul F. Atwood, Cologne, to the Department of Commerce.

The domestic demand alone has lately taxed the capacity of the industry to the limit. The report says that practically all possibilities afforded by plant extensions, modernization of equipment, organization measures and the like have now been exhausted and it is difficult to procure additional skilled labor. At the present time the delivery terms for non-preferential domestic orders received by the German machine-tool industry are two years in the case of specially designed machines, and one year for standard equipment.

Notwithstanding the domestic situation, efforts to expand Germany's machine tool exports, the bulk of which consists of metal-working machinery, have been intensified during the current year. (Editor's note—It is to be assumed that war has halted these efforts.) Foreign shipments during the first half of 1939 rose to a value of 106,000,000 reichsmarks (approximately $42,000,000), as against 86,000,000 reichsmarks ($34,000,000) in the corresponding period of last year, an advance of about 23 per cent. Since the first of the year, however, foreign demand has shown a downward trend, it is pointed out.

Japan ranked as the outstanding foreign market for German machine tool exports in the first six months of this year, followed by Italy, Great Britain, Danzig-Poland, Rumania and Russia. Other important outlets were Hungary, France, Turkey, Argentina, Brazil, Sweden, and Switzerland.

Cutler-Hammer, Inc., Milwaukee, has expanded facilities and stocks covering its lines of electrical products to serve the Colorado territory and has added personnel.

Motorized Helical Gear Reducer
Worm Gear Reducer
OTHER LINK-BELT POSITIVE DRIVES INCLUDE:
Silverlink Roller Chain Drive
Silverstreak Silent Chain Drive
P.I.V. Gear and V.R.D. Variable Speed Units

Constant 24-hour service for 10 years
No repair expense... and still operating perfectly!

● This Link-Belt S-16 herringbone gear reducer was installed in 1929. Since then, it has operated continuously, day and night, without a moment's failure or a penny's cost for repairs. Such performance is typical of Link-Belt speed reducers. Q You can be sure of years' of trouble-free, dependable performance when you select your reducer from the complete Link-Belt line. Q Link-Belt manufactures herringbone gear, worm gear and motorized helical gear units in a variety of sizes, ratios and horse powers to meet practically any requirement. Send today for catalogs on any or all of the Link-Belt positive drive units illustrated. Address: Link-Belt Company, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, Toronto, or any of our other offices, located in principal cities. 7659-B

LINK-BELT
SPEED REDUCERS

See Our EXHIBIT at the IRON AND STEEL EXPOSITION
SPACE 73, WILLIAM PENN HOTEL, SEPT. 26-27-28-29

. . . PERSONALS . . .

JOHN C. GEARHARDT, who has had a long and varied experience in the tool steel field, has been appointed manager of tool steel sales in the Detroit district for Allegheny Ludlum Steel Corp., Pittsburgh.

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JOHN P. HOELZEL has been made president Pittsburgh Screw & Bolt Corp. He was formerly vice-president and general sales manager and has filled various sales positions in the company during the last 35 years. JOHN M. YAHRES, executive vice-president, was recently elected a member of the board of directors.

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PHILIP G. JOHNSON has been elected president of both Boeing Airplane Co. and Boeing Aircraft Co. according to C. L. EGTVEDT, who has been elected chairman of both companies. Mr.

JOHN P. HOELZEL, new president of the Pittsburgh Screw & Bolt Mfg. Co.

Egtvedt and Mr. Johnson both attended the University of Washington at the same time and both joined the Boeing company in 1917 as draftsmen in the engineering department. Both subsequently worked up to executive positions in the company. Mr. Johnson turned to the transport end of the business following the formation in 1927 of the Boeing Air Transport System (now United Air Lines). Subsequently, as head of the transport company, he moved his office to Chicago. During the past two years Mr. Johnson has been vice-president in charge of operation of the Trans-Canada Air Lines. His work in behalf of Trans-Canada has been substantially completed and he leaves it to return to the Boeing company. Mr. Johnson is president of Kenworth Motor Truck Corp. of Seattle and will retain this post. He has been with the Kenworth Corp. since February, 1936.

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JOHN LYON COLLYER, former joint managing director of Dunlop Co. Ltd., in England, has been elected president of the B. F. Goodrich Co., Akron, Ohio. Mr. Collyer, who was graduated from Cornell University in 1917, plans to sail immediately for the United States. At Cornell he was captain of the crew in his senior year.

❖ ❖ ❖

H. B. KRAUT, president and general manager of the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.,

Put Your Sheet Problems up to NEWPORT

Fifty years devoted to the production of high quality iron and steel sheets have given Newport very definite ideas about the "right sheet for every job" and the application of Newport sheets for the diversified requirements of industry.

Many users have found it profitable to select Newport as their chief source of supply, thereby enjoying the quality advantages of product specialization and precision manufacturing, and the benefits of Newport metallurgical research and development.

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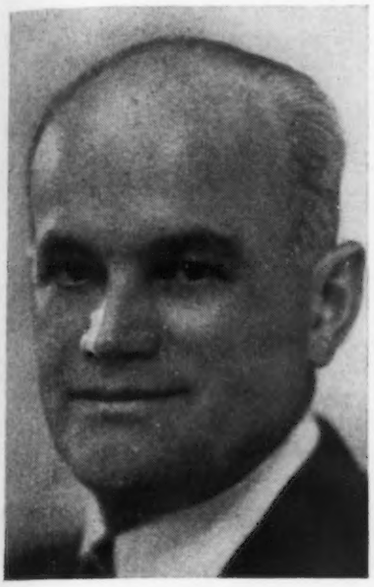
DIVISION OF THE ANDREWS STEEL CO.

ANDREWS PRODUCTS IN CARBON AND ALLOY STEEL: Blooms • Forging Billets • Re-rolling Billets • Slabs • Universal Mill Plates • Sheet Bars.



JOHN C. GEARHARDT, Detroit district manager of tool steel sales for Allegheny Ludlum Steel Corp.

was principal speaker at the Fond du Lac Lion club's regular meeting, describing conditions in Europe just prior to the outbreak of actual hostilities. Mr. Kraut, with his family, returned from a trip abroad on the Bremen the last time it docked in New York.

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M. D. JOHNSON, chief inspector of the Caterpillar Tractor Co., Peoria, Ill., was the principal speaker at the September meeting of the Wisconsin Chapter of the American Foundrymen's Association, meeting at Hotel Schroeder in Milwaukee, Sept. 15. He discussed "Machine Shop Control and Inspection of Castings."

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FRANCIS A. CALDEN, formerly with the E. W. Bliss Co., has joined the hydraulic press sales staff of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. He will make his headquarters at the main office of the company, but will travel extensively.

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R. CARSON DALZELL has joined the Baltimore division of Revere Copper & Brass, Inc., New York, as technical adviser. He received the degree of Doctor of Science in Metallurgy from Harvard University in 1929 and was identified with the research laboratory of the American Smelting & Refining Co. from that time until 1931, when he resigned to join the Ajax Metal Co. Later he became engaged in general metallurgical consulting work.

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W. J. FAIRBAIRN, secretary of the National Metal Trades' Association in Milwaukee, for 32 years until his retirement, has been placed in charge of the apprentice advisory department of the public employment office in Milwaukee. He became interested in the apprentice system in 1903 and now advises those in the factories and those seeking work. There are 850 apprentices in metal trades plants in Milwaukee and 2500 in factories in Wisconsin.

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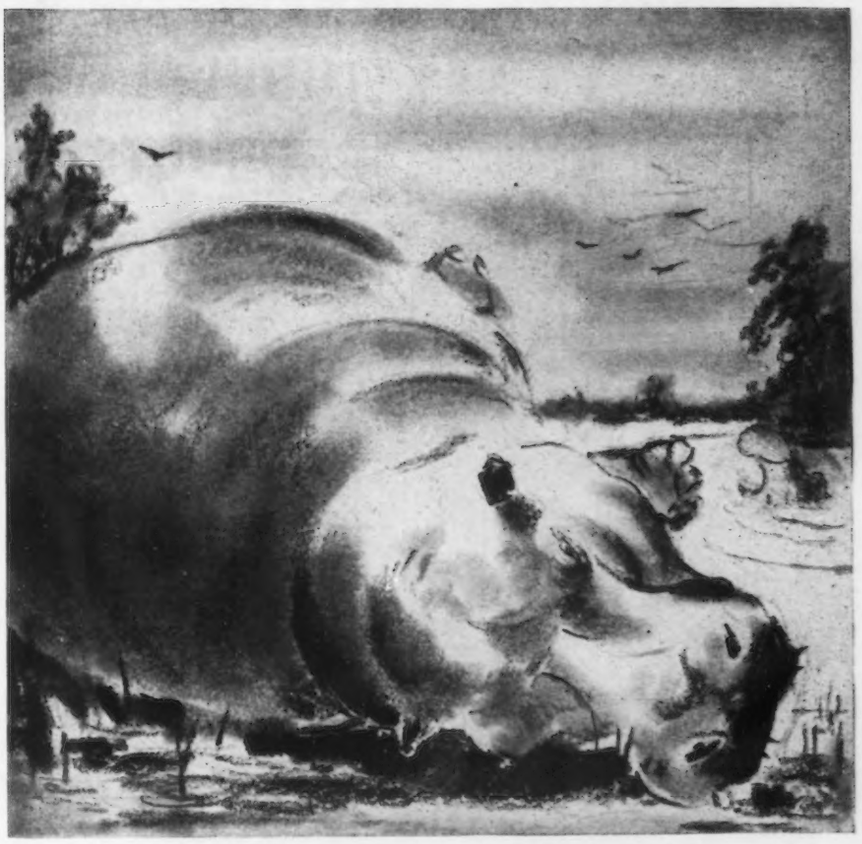
DANA J. FOX, for four years vice-president, treasurer and a director of Fretz-Moon Tube Co., Butler, Pa., has been appointed assistant treasurer of the National Supply Co., Pittsburgh, effective Oct. 1. A native of Pittsburgh, Mr. Fox was for six years in the treasury department of the

FOR HOT, HEAVY ROLLING . . .



STEEL PICKS PENOLA!

WITH steel temperatures up to 2,600° F. and roll neck pressures exceeding one million pounds, you've *got* to be sure of your lubricants. That's why most steel men pick Penola. They know Penola lubricants were made to stand up under conditions far tougher than any found in actual mill operation.

And with bearings costing over $5,000.00 each and forced shut-down time of a modern, continuous strip mill causing a loss of more than $100.00 per minute—proper lubrication is *important!* No wonder the majority of all roller bearing installations in steel mills of the U. S. and Canada are Penola-lubricated!

So it's easy to see why Penola produces and sells more steel mill lubricants than any other maker in the world. Consult Penola's lubrication engineers about *your* problems...it's a profitable habit!

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LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

American Sheet & Tin Plate Co., then from 1919 to 1931 in the credit department of Republic Steel Corp. and for the past eight years has been associated with the Fretz-Moon organization.

❖ ❖ ❖

ARTHUR C. EVANS, formerly connected with the Continental Roll & Steel Foundry Co., East Chicago, Ind., has been appointed to the engineering staff of Gar Wood Industries, Inc., which recently acquired the Continental tractor equipment division.

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ARTHUR R. JANES, president and general manager of the Standard Foundry Co., Racine, Wis., recently made his first solo flight at the Racine airport.

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A. J. ACKERMAN heretofore development engineer for the engineering works and contracting division of the Dravo Corp., Pittsburgh, has been appointed director of engineering.

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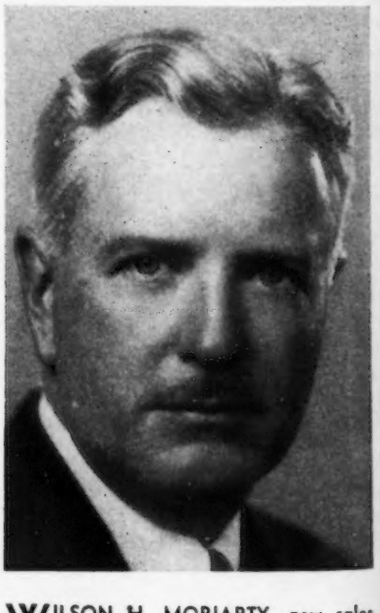
L. H. FROST, formerly of the Electric Controller & Mfg. Co., has been

KENNETH J. BURNS, whose appointment as manager of the Cincinnati district sales office of the Inland Steel Co., Chicago, was announced in The Iron Age, Aug. 17.



WILSON H. MORIARTY, new sales manager of the Cleveland works of the National Malleable & Steel Castings Co. Details of his career appeared in these pages last week.

A TUBULAR FURNACE *for* TUBULAR PRODUCTS

Upper left:—charging end of Salem pipe normalizing and drawing furnace, lower right: — discharge end of same furnace.

The solution to another difficult problem—to normalize and draw pipe in the same furnace—has been achieved by "Salem" engineering.

The furnace shown treats 18 tons of pipe, either normalizing at 1650 deg., Fahr. or drawing at 900 deg., Fahr. with normalizing gas consumption as low as 750,000 B. t. u. per ton and as low as 600,000 B. t. u. for drawing. One hour is required to raise furnace from draw temperature to normalizing temperature; two hours to lower from normalizing to draw. The cooling process does not require the wasteful use of pipe to cool furnace down to draw temperature.

Information on this or other "Salem" achievements in industrial heating problems gladly furnished on inquiry.

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New York; Chicago; Detroit; Pittsburgh; London; Paris; Berlin; Welland, Ont.

SALEM ENGINEERING COMPANY

made Detroit district manager of the Thomson-Gibb Electric Welding Co., Lynn, Mass.

❖ ❖ ❖

HOWARD BURK, for the past 20 years in charge of the screw products division in Chicago of the Scovill Mfg. Co., Waterbury, Conn., has become associated with the General Screw Mfg. Co., Chicago.

Tool Engineers to Hold Cleveland Sessions as Planned

DESPITE the cancellation of the Machine Tool Show, the American Society of Tool Engineers is going ahead with plans to hold its fall meeting at Cleveland, originally scheduled as a part of the Machine Tool Congress. On Friday evening, Oct. 6, the semi-annual dinner is to be held at the Hotel Statler where Prof. John M. Younger of Ohio State University will present a report on "The Effect of the Development of the Machine on Employment and Our Standard of Living." Hamilton Fish, congressman from New York, will speak on "Economic and Political Effects of the Development of the Machine."

Saturday morning a technical session on bearings is planned. Stanley R. Thomas, chief engineer, Bantam Bearing Corp., South Bend, Ind., will discuss the application of anti-friction bearings to machine tools; Eugene Bouton, supervisor of time study, J. I. Case Co., Racine, Wis., will talk about plain bearings for the same purpose, and Karl L. Hermann consulting engineer of South Bend, will rationalize the two viewpoints. This discussion will be led by S. L. Crawshaw of Westinghouse Electric & Mfg. Co. Plant visits are scheduled for both Friday and Saturday.

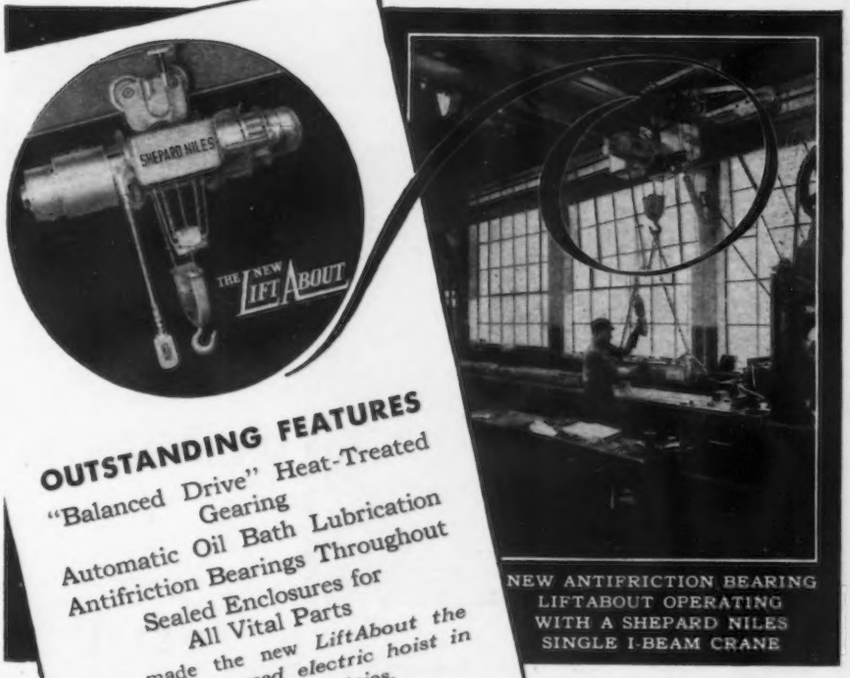
Elmira Tool Engineers Meet

SIXTY-FIVE members and guests of Elmira chapter, No. 24, American Society of Tool Engineers, met recently at Elmira, N. Y., to hear V. H. Erickson, research engineer of Norton Co., Worcester, Mass., discuss "Refined Surface Finishes as Applied to Regrinding of Metal Cutting Tools." Two motion pictures in technicolor, "Norton Abrasives" and "Norton Abrasives at Work," were presented. The next meeting of Elmira chapter is planned for the second week in October.

40 Industries to Exhibit At Chemical Exposition

MORE than 40 industries, producing chemical materials and equipment, will display their newest products at the 17th Exposition of Chemical Industries to be held at Grand Central Palace, Dec. 4-9. Metals and alloys will be represented in demonstrations of manufacturing processes, and by the innumerable applications for which they are used in the chemical industry. Bronze, iron, steel, and a wide variety of alloys will be featured in globe, angle, gate, check, and relief valves, also in liquid level gages. Chemical compounds and natural minerals of titanium and zirconium will be shown. These elements will also be represented in terms of chemicals, ceramics, refractories, and metallurgical products. Platinum and palladium will be exhibited in their role as catalysts, also as laboratory ware, spinnerets for rayon, and electrical

The new LIFT ABOUT
ELECTRIC HOIST
CAPACITIES ONE-EIGHTH TO TWENTY TONS



NEW ANTIFRICTION BEARING LIFTABOUT OPERATING WITH A SHEPARD NILES SINGLE I-BEAM CRANE

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"Balanced Drive" Heat-Treated Gearing
Automatic Oil Bath Lubrication
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have made the new *LiftAbout* the most widely used electric hoist in American Industries.
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Cut Production Costs *with*

Carey HEAT-INSULATIONS

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For temperatures up to 300°F.

85% Magnesia
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Modern industrial plants are saving thousands of fuel dollars each year through the correct application of CAREY Heat Insulations . . . a complete line of high efficiency insulating materials of Asbestos and Magnesia for every known service condition—for temperatures ranging from

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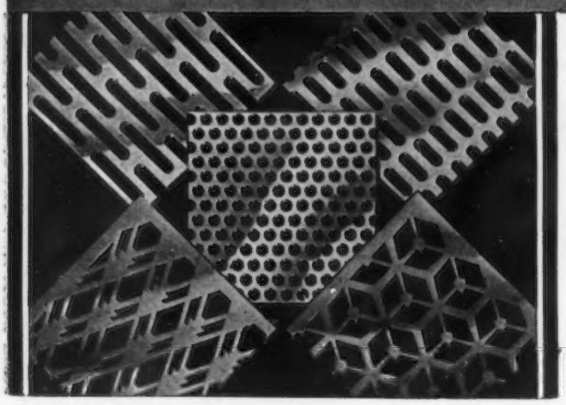

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contacts. Platinum-clad base metals are now available in the form of sheets, tubes and wire. Platinum catalysts are used in the production of rayon, glass fibre, fertilizers, and war munitions.

Armco Mill Reports New Rolling Record

THE cold reduction mill of the American Rolling Mill Co.'s Middletown plant Sept. 12 established a new production record when it rolled 809 tons of strip during an 8-hr. turn. This is said to exceed all known production records previously made. None of this strip was over 56 in. wide. The Armco mill also established a new 24-hr. production record by rolling 2,132 tons. Approximately enough steel strip was rolled in this 24-hr. period to lay a steel sidewalk about 4½ ft. wide between New York and Philadelphia.

Raw Material Stocks 19% below 1938 Peak

MANUFACTURERS' inventories of raw materials fell about 1 per cent of volume in July, continuing the decline that began in the spring of 1938, according to a preliminary estimate of the Division of Industrial Economics of the National Industrial Conference Board. The cumulative decline, which has amounted to 19 per cent in the space of fifteen months, brought the Conference Board's Index of Raw Materials down to 94 (1936 = 100), the lowest point in the six-year period covered by the index.

Rise of 25% Seen in Steel Carloadings

PITTSBURGH—Iron and steel carloadings in western Pennsylvania and nearby territories during the fourth quarter are expected to exceed the volume moved in the last quarter of 1938 by at least 25 per cent, according to the Allegheny Regional Advisory Board, a group of shippers. At the same time the group expects total car loadings in the district covered to increase more than 12 per cent from the last quarter in 1938. While these estimates are conservative they involve the expectation of a substantial increase in actual car movements.

Arthur G. McKee & Co., Cleveland, has declared a regular dividend of 25c., and an extra dividend of 25c., or a total of 50c. per share, on the Class "B" common stock of the company. Including the present dividend, $3.50 per share will have been paid on this stock during 1939.

. . . OBITUARY . . .

JOHN FRANKLIN MILLER, vice-chairman of the board and formerly president of the Westinghouse Air Brake Co., Wilmerding, Pa., died at Goshen, N. Y., Sept. 17, after nearly a year's illness. He was born at Port Perry, Pa., in 1858. In turn he attended Newell Institute, Pittsburgh, Western University of Pennsylvania, now the University of Pittsburgh, and Wooster (Ohio) College, class of 1881. In 1888, after a number of years in the coal business, Mr. Miller went to work for the Philadelphia Co., of which George Westinghouse was president. Within a year the company became known as the Westinghouse Air Brake Co. and in 1899 Mr. Miller became assistant secretary. In 1902 he was made secretary and in 1905 vice-president. He became president in 1916 and vice-chairman of the Board in 1919.

Mr. Miller was also vice-chairman of the board of the Pittsburgh Screw & Bolt Co., chairman of the board of the First National Bank of Wilmerding, Pa., and a member of the boards of American Brake Co., Canadian Westinghouse Co., Fidelity Trust Co. and Massey Concrete Products Corp.

For many years, especially during the presidency of the late Herman H. Westinghouse, Mr. Miller was active in developing the labor policy of the Air Brake company, in which friendliness and justice were so emphasized that in all its history the company has not had a strike. Among Mr. Miller's benefactions was the gift of Hygeia Hall to his alma mater at Wooster, Ohio.

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HEROLD HUTCHINGS, junior partner in the Irwin & Hutchings Co., Detroit, was buried Sept. 9. Mr. Hutchings, who was 41 years old, was well known in automobile circles, having been active as a supplier of paints, air-compressors and equipment.

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FREDERICK YAEGER, assistant manager for the Ford Motor Co., St. Paul, Minn., factory, and long a resident of Detroit, died Sept. 12 in St. Paul of injuries suffered in a fall from a horse. Mr. Yaeger was connected with the Ford company for 15 years, including six years in the export department in South America. He had been assistant manager of the St. Paul plant for two years.

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HARRY E. HEATH, vice-president and general sales manager of the industrial and marine engine division of the Chrysler Corp., died recently. Mr. Heath, who was 44 years old, had

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DIVISION OF ASSOCIATED SPRING CORP. 1800 CLYBOURN AVE., CHICAGO, ILL.

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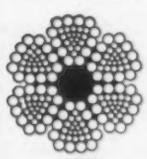
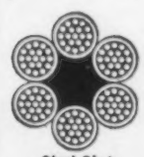

"B" Flattened Strand

Wire Rope Center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You Can Depend On "HERCULES"* (Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close co-operation with users.

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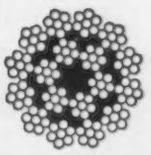
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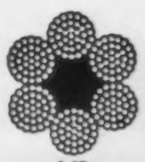
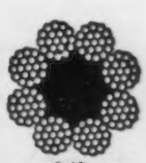
6x19 Filler Wire

6x19 Seale


6x37 Extra Flexible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5 ton Lifter in manufacturing plant

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Tong action and automatic take up safely grip loads. End control protects operator.

BETTER
High grade stock handled without surface scratches or damage to edges.

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Handle packs of sheet steel instead of single sheets. Sheet storage room reduced.

FASTER
Jaw adjustment made in a few seconds. One man control.

20 ton cap. Lifter in 80" strip mill

Also made for handling tinplate, ingot molds, paper rolls, pipe, tubing, castings, tote boxes, flasks, skids, etc. Capacities 2 to 60 ton. Special designs to suit your requirements.

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Locomotive Cranes, Car Pullers, Buckets, Welding Positioners

served overseas as a naval aviator in the World War.

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CHRISTOPHER C. SMITH, founder of the Chris-Craft Corp., died Sept. 9 at Mt. Clemens, Mich., He was 78 years old and was designer and builder of the first watercraft in Michigan to be powered by an internal combustion engine. He was also designer of the first of the series of Miss Americas that won the Harmsworth Trophy and for ten consecutive years he built the boat that won the famous Gold Cup.

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M. FRANK WILSON, general superintendent of the Cleveland File Co., Cleveland, until his retirement in 1934 due to ill health, died Sept. 15 at his home at the age of 62. A native of Norway, he was widely known in the file and saw industry and had previously been in the employ of Nicholson File Co., and the Rex File & Saw Co.

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ISRAEL BIALOSKY, former partner in the Cleveland Iron & Metal Co., Cleveland, died Sept. 11 at his home in Shaker Heights, Ohio. A native of Poland, he was 78 and had lived in Cleveland since he was a small boy. He was active in social and welfare organizations and is survived by five sons, I. J., Charles, William, Leon and Morton Bialosky.

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JAMES MEEHAN, JR., one of the organizers of the Meehan Boiler & Construction Co., Lowellville, Ohio, died suddenly Sept. 10 in Youngstown. Mr. Meehan retained his title of secretary-treasurer and general manager of the Lowellville firm although he retired from active work three years ago because of ill health. He was 63 years old.

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ROBERT SWETT, superintendent of the Brightwood branch of the Moore Drop Forging Co., Springfield, Mass., died on Sept. 8 at a Bennington, Vt., hospital as a result of injuries received in an automobile accident. He was 51 years old.

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JOHN L. ALLEN, who had lived in Detroit since 1913 and was connected with the automobile industry, was buried Sept. 16. Mr. Allen operated his own business, the Peninsular

MEMO

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OPEN HEARTH STEEL SHEETS AND WIRE PRODUCTS

CONTINENTAL
CONTINENTAL STEEL CORPORATION
KOKOMO, INDIANA
Plants at Kokomo, Indianapolis, Canton

Auto Parts Co., for three years after he went to Detroit. In 1916 he went to work for Chevrolet Motor Car Co. and in 1922 he became connected with Cadillac Motor Car Co., where he was active until his retirement in 1932. He was a mechanical engineer specializing in machine tools. He was 70 years old.

❖ ❖ ❖

EUGENE NOBLE FOSS, died at his home in the Jamaica Plain district, Boston, on Sept. 13. Born in West Berkshire, Vt., Sept. 24, 1858, he attended University of Vermont two years, became salesman for the B. F. Sturtevant Co., Boston, and successively treasurer and president of the company. Republican and democrat, advocate of reciprocity with Canada, he was and was not successful at election equally, but did fill an unexpired term as congressman and served as Governor of Massachusetts three terms.

❖ ❖ ❖

J. H. PETREE, president, Perfection Bed Spring Co., Mansfield, Ohio, died recently.

Steel Standardization

(CONTINUED FROM PAGE 49)

In addition to these general items, it is usually desirable to stock the low-carbon-manganese grade of steel as oversize stock in sizes from ¼ to 2 in. diameter by intervals as listed above. If the oversize limit is selected 0.13 to 0.16 in. above the basic fractional size, the sizes from ¼ to 1 in. can be obtained without a special size extra merely by ordering the steel in 1/64-in. sizes, that is ½ in. oversize would be ordered as 33/64 in. However, the sizes from 1 to 2 in. will take a 25c. per 100 lb. special size extra unless purchased in lots of 2000 lb. or more. This finish is especially suitable for parts such as cyanided or case hardened pins, shifter shafts that must be held to close tolerance, and many miscellaneous parts that can be ground directly from the stock size.

There are also numerous applications that require the use of the low-carbon-manganese grade as cold-drawn and ground. This grade is suitable for shafts requiring slightly more accuracy and better finish than are available with the cold-drawn grades. The sizes of this stock required can usually be limited to the range of ⅜ to 1¼ in.

As previously stated, a turned and ground stock is required for such parts as lead screws, and this type of stock is generally required only in the medium-carbon-manganese grade. Wherever possible, the sizes should be made to conform to the standards previously outlined. However, if special size screws have been designed, it is rarely advisable to make radical changes to conform to a standard stock size.

This program would only permit the possible use of about 350 to 400 items of round bar stock, as compared with 2500 possible items if no restrictions were set up. In most actual applications the full range of sizes will not be required for all grades. An average stock list set up on the basis of the above discussions will have between 200 and 275 active items. That is, the program as discussed will reduce the average round bar stock from 30 to 50 per cent.

Ed. Note:—In the Oct. 5 issue, the author will continue with a general outline of the properties of steel which should be definitely specified, and also includes typical purchasing specifications.

Proving FEDDERS Unit Heaters Are Engineered To Give You EXCLUSIVE TROUBLE FREE FEATURES

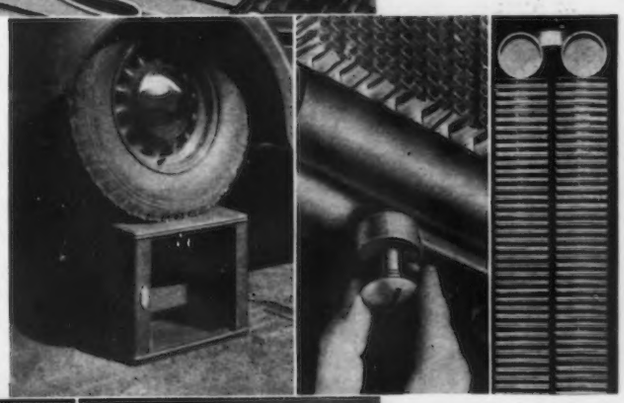
Plus STREAMLINE DESIGN

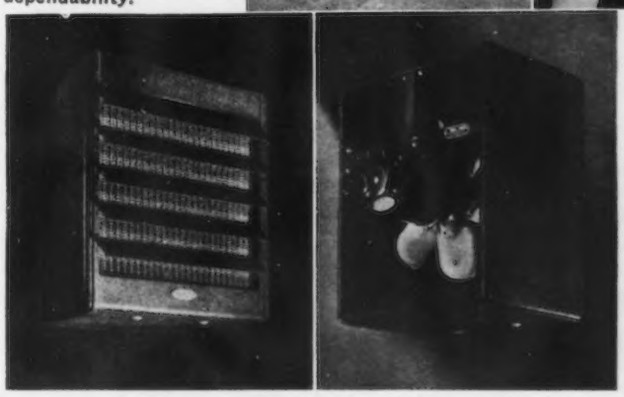
Cross section shows how Fedders streamline tubes and saddle fins "follow-through" with identical aerodynamic principles of modern aviation.

Sturdy Fedders Cabinet supports weight of heavy eight cylinder automobile.

Fedders patented Full-Floating Mounting eliminates expansion and contraction stresses between heating element and cabinet.

Exclusive Double Header manifolded at center provide unusual free steam passages resulting in long life dependability.





Front view of handsome cabinet that is finished in rich brown.

Rear view reveals clean design throughout . . . also resilient motor mountings to isolate vibration. Fedders Series 4 Unit Heaters are built in 25 models from 75 to 1100 EDR. Write for Bulletin 573.

FEDDERS MANUFACTURING COMPANY
59 Tonawanda St. Buffalo, N. Y.

. . THE NEWS IN BRIEF . . .

Auto industry's new model program continuing without interruption. Aircraft expansion having effects on Detroit industry and personnel. Closed shop demand by UAW-CIO seen as threat to aviation manufacturers.—**Page 60.**

Navy Bureau of Supplies and Accounts awards machinery orders.—**Page 66.**

Railroads are ready, Association of American Railroads says.—**Page 67.**

NLRB orders election in plant of Florence Pipe Foundry & Machine Co., Florence, N. J.—**Page 67.**

Government steel awards in week totaled nearly $5,000,000.—**Page 68.**

Canadian industry to be greatly stimulated by war.—**Page 69.**

Triplex Machine Tool Corp. plans exhibit of its own.—**Page 70.**

Covered Wagon Co., Mount Clemens, Mich., opens new welding division. —**Page 71.**

Consumption of scrap up 14 per cent in August.—**Page 71.**

CIO-AFL strike at Bendix plant settled without closed shop.—**Page 71.**

Syracuse purchasing agents' exhibit opens Sept. 27.—**Page 71.**

National Steel Corp. pays dividend of 40c. a share.—**Page 71.**

Steel purchases now must be licensed in Great Britain.—**Page 72.**

Germany has taken over most of Poland's iron and steel industry.—**Page 72.**

War may aid building construction.—**Page 73.**

Germany short of machine tools, according to Department of Commerce report.—**Page 73.**

Forty industries to exhibit at the Chemical Exposition.—**Page 77.**

Elmira Tool Engineers Meet.—**Page 77.**

American Society of Tool Engineers to hold Cleveland session as planned.—**Page 77.**

Armco mill reports new rolling record. —**Page 78.**

An increase of 25 per cent in steel carloadings in fourth quarter estimated.—**Page 78.**

SECTIONS INDEX

Personals	74
Obituary	79
Current Metal Working Activity	84
Steel Ingot Production	89
Summary of the Week	90
Comparison of Prices	91
Pittsburgh, Chicago, Cleveland, Philadelphia and New York markets	92
Scrap Market and Prices	98
Finished Iron & Steel	100
Pig Iron & Raw Material Prices	102
Warehouse Prices	103
Fabricated Steel	104
Non-ferrous Market	105
Plant Expansion & Equipment	106
Machine Tool Activity	108

MEETINGS

Sept. 20 to 22—National Industrial Advertisers Association, New York.

Sept. 26 to 29—Association of Iron and Steel Engineers, Pittsburgh.

Oct. 5 to 7—Society of Automotive Engineers, aircraft production meeting, Los Angeles.

Oct. 6 and 7—Foundry Equipment Manufacturers Association, White Sulphur Springs, W. Va.

Oct. 16—Society of Automotive Engineers, annual dinner, New York.

Oct. 17—National Association of Sheet Metal Distributors, Atlantic City, N. J.

Oct. 16 to 20—National Safety Congress and Exposition, Atlantic City, N. J.

Oct. 23 to 27—National Metal Congress, Chicago.

Oct. 24 to 26—Purchasing Agents Association of Baltimore, products exhibit, Baltimore.

Raw material stocks 19 per cent below 1938 peak.—**Page 78.**

Vanadium-Alloys Steel Co. reports that it has ample supply of tungsten.—**Page 85.**

Senator Bridges tells foremen of employees' "false friends." — **Page 85.**

Machine tool index for August, while still above 200, declined 24 points from July figure.—**Page 108.**

Broad demand puts domestic machine tool orders ahead of foreign business last week. All types of manufacturers buying, although Government military demands are a factor. Machine tool plants on a 24-hr. basis. Deliveries lengthen. —**Page 108.**

Larger U. S. merchant marine, strengthening of British convoy system expected to ease export difficulties for American shippers.

Steel hearings before TNEC likely to be set back to last week of October.

War Department distributes $6,317,000 in military pursuit plane contracts.

Be Lucky, Steel Leader Advises Younger Men

"I HAVE had a wonderful break in life," Mr. Schwab once told an acquaintance. "My happy marriage, like everything else in my life, is a matter of luck. I happened to marry the right girl, that's all. And I happened to get started in the steel business.

"When I was 17 years old I had never been more than 20 miles from Loretto, but I had the good luck to get into steel making, and when I was 24 I was the manager of the biggest steel plant in the world. What's that but luck?

"I never was an outstanding engineer or a really first-class chemist, but I was advanced over the heads of more competent men until I frequently found myself at the top. After that it was easy."

Who Invented Your Job?

FOLLOWING are a few of the jobs created by invention and improvement during the latter part of our machine age. All of them are due to basic time saving inventions saving machine to cover the by invent

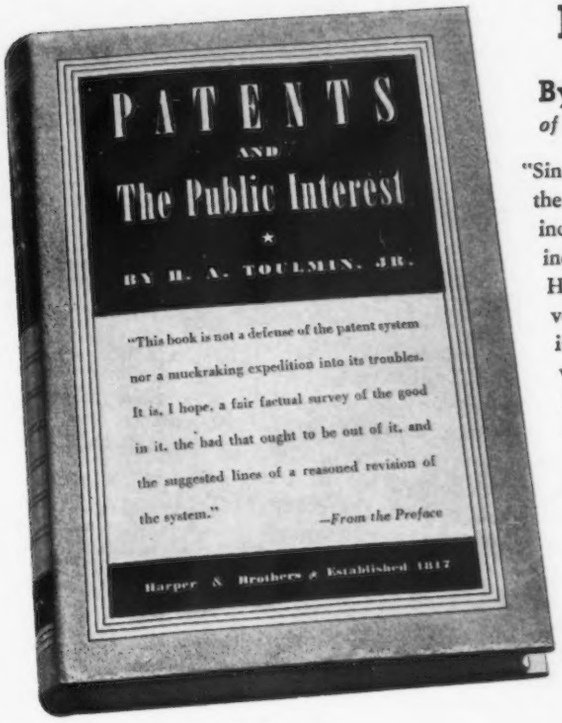
making plants—cash register designers—workers producing aluminum paint—engineers and firemen in plastic product plants—makers of control apparatus for electric furnaces—chemists in radium extraction makers of panel instruments—assemblers

workers for rubber tires—diesel motor engineers—designers of electric welding apparatus refinery workers producing gasoline for sumakers of precision tools and instruments of all kinds for air- of special thermos container service on airplanes—workmills—tire dealers and lamp draftsmen—to make rayon—automotive en- assemblers—ash register ors—salesmachine elecians—foundengines—um plants ns apply- ear operof spark ir station m makers onducting al station manufaachines—ric welder handlers d in furisory and plants—graving—furnace —workers ment for e draftsorcess in ineers in engineers —arrangradio enope makds—maks radium rvisors of of windn of sheet ing and in tire automein diesel packers—plants—af upteriors—adio men —halftone l rollers f instruftenders f blank h registcetylene ene furasser agners af f linators for of prospecial fabriinner facturoperators makers produstools—hromiices in makers rs and plants hines—cash e flyls for h reoduc- nstru- rayon alves, preebody plants for eleclamp en— set mill zing lane ers, of on io tie ew- men

making plants—cash register designers—workers producing aluminum paint—engineers and firemen in plastic product plants—makers of control apparatus for electric furnaces—chemists in radium extraction makers of panel instruments—assemblers of

workers for rubber tires—diesel motor engineers—designers of electric welding apparatus refinery workers producing gasoline for sumakers of precision tools and instruments of all kinds for air- of special thermos container service on airplanes—workmills—tire dealers and lamp draftsmen—to make rayon—automotive en- assemblers—

New! A book that *GOES TO BATTLE* for AMERICAN Business Research and Development!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"This book is not a defense of the patent system nor a muckraking expedition into its troubles. It is, I hope, a fair factual survey of the good in it, the bad that ought to be out of it, and the suggested lines of a reasoned revision of the system."
—From the Preface
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By H. A. TOULMIN, JR.
of Toulmin & Toulmin, Dayton, Ohio

"Since 1880, scientific research has been the origin of fifteen major manufacturing industries which have created directly and indirectly some 15,000,000 NEW JOBS." Here is a realistic and common sense survey of the United States patent system—its actual workings and its effects—by a well-known corporation and patent lawyer, H. A. Toulmin, Jr. He examines the "displacement of labor" by inventions; finds the one solution for unemployment in the research and development work of corporations. This book performs an outstanding and timely service. It is outspoken in considering threatened attempts to abridge the public's rights under the democratic system by which patents are granted, as a reward for intellectual initiative. The author analyzes the various proposals for reform of the patent laws, and considers the practical results of such proposals. He submits plain facts about patents and public problems: such as patent pools and illegal monopolies . . . suppression of patents . . . displacement of labor . . . the throttling of research . . . how to protect the "little man"...

Many questions of primary importance to you as a business man in these days, are discussed here in detail. You owe it to yourself to read this book. It is of vital interest to corporation executives, manufacturers, lawyers, inventors, engineers, industrial research workers. You can examine it FREE; see coupon below.

CONTENTS

National Importance of Invention • Economic Importance • Purpose of Patent Laws • Public Policy • Why Have Patents? A Public Investigation of Patent Pools • Do Illegal Monopolies Hide Behind Pools? Public Protection From Pools • Do Inventions Displace Labor? • Are Patents Suppressed? Compulsory Licensing • Do Patents Throttle Research? • The Effect of Invention on the Farmer • Reorganization of the Patent System • Patent Office and Courts • Changes Recommended • Tools of Industry • New Materials, Products • New Foods and Domestic Conveniences • New Public Conveniences • New Industries: New Jobs Medical Inventions • The Farm Factory The Perfect Solution for Unemployment

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Bridges Tells Foremen of Employees "False Friends"

PITTSBURGH—Those who distort the picture of management to the worker by telling him he is the sole instead of the mutual producer of wealth are the real exploiters of the laboring man, Senator Styles Bridges, Rep., N. H., told more than 1800 foremen attending the 16th annual convention of the National Association of Foremen, held here last week.

Pointing out that managers have a double responsibility—one to the employees and one to those whose savings they use—Senator Bridges said: "It is this group, of which you are a part, that has been in the cross-fire of the so-called social revolution now burning out. It is the group that wears the honorable wound stripes of the conflict, the group that deserves such medals as we bestow upon the soldiers of our wars."

"I have a bitter feeling against those false leaders who have led our workers up the blind alley of hate and despise for the man who was struggling heroically to sustain them in their daily bread—who left them there in bewilderment. A lot of time has been lost by those whose every day's work figures so largely in the total wealth of their life," He said.

Foreman of Tomorrow

Other speakers at the foremen's convention, the general theme of which was the "foreman of tomorrow," included Hartley W. Barclay, Editor, *Mill and Factory*, Dr. Allen Stockdale, National Association of Manufacturers, John G. Jones, vice-president, Alexander Hamilton Institute, Sherman Rogers, author, lecturer and industrial consultant, and many others who took part in various sectional meetings. The concluding address was made last Sunday by A. C. Horrocks, Public Relations Division, the Goodyear Tire & Rubber Co. A keynote speech entitled "The Challenge," an answer of an American workman to many of the problems and opinions brought out in the sectional meetings was made by Archie W. Graham of the Elliott Co.

In defending American industry against unjustified criticism Dr. Allen Stockdale, National Association of Manufacturers, discussed the turnover of payroll dollars and pointed out that each $100,000 invested in a plant employs 150 people who support 1000, produces a payroll of $200,000, supplies trade to a dozen stores, fills a ten-room school house, affords opportunities for a dozen professional men, uses up 200 homes, buys farm products from 8000 acres, provides a taxable valuation of a million dollars.

Warns of Labor Dictatorship

In an address, "Supervision in a Democracy," Hartley W. Barclay described the monopolistic conditions and the lack of freedom for both industry and labor in foreign countries where dictatorships exist. He warned against the dire consequences of a labor dictatorship in this country and touched on the tendencies towards labor dictatorships which have been apparent here during the past seven years, saying that such things have no place in a democracy.

In discussing cooperation between American business and American labor John G. Jones, vice-president, Alexander Hamilton Institute, said: "It is hardly necessary for me to state that in the past the attitude of too many industrialists was largely responsible for much of the present antagonism towards industry on the part of labor. Today, business and industry realizes that peace can only be attained on a basis of sound, human understanding and a full realization of the problems of both employers of labor and labor alike. . . . The keynote of peace is understanding and understanding is based upon education, the study of the other man's problems and the ability to coordinate and interweave the interests of both employer and employee into one harmonious philosophy."

More in Peaceful Markets

Frank J. Shaeffer, Republic Steel Corp., and president, National Association of Foremen, pointed out that the United States had more to gain from developing "peace" markets in South American than from any type of business that might result from warring nations in Europe.

Coincident with the national convention the foremen's group also held its second annual exposition where a host of industrial concerns presented their latest developments. Following some of the meetings the foremen visited several Pittsburgh industrial plants.

National Association of Foremen officers elected last week were, president, A. C. Horrocks, public relations division, Goodyear Tire & Rubber Co., Akron, Ohio; executive vice-president, C. S. Coler, industrial relations division, Westinghouse Electric & Mfg. Co., Pittsburgh. Edward Seving, Sidney Grain Machinery Co., Sidney, Ohio, was reelected treasurer; and H. G. Evans, Goodyear Tire & Rubber Co., Akron, Ohio, was reelected secretary.

Directors elected last week and including hold-over directors are as follows:

Fred Clapper, Kalamazoo Stove Co., Kalamazoo, Mich.; William Severance, Consumers Power Co., Battle Creek, Mich.; Paul Bergevin, Anderson public schools, Anderson, Ind.; William Edgecombe, Continental Steel Corp., Kokomo, Ind.; Harold Arlin, Westinghouse Electric & Mfg. Co., Mansfield, Ohio; A. M. Degner, Surface Combustion Co., Toledo, Ohio; Ben Galle, Frigidaire Corp., Dayton, Ohio; H. C. Vincent, Columbus & Southern Electric Co., Columbus, Ohio; J. E. Blose, Robbins & Myers, Springfield, Ohio; Roy Thomas, B. F. Goodrich Co., Akron, Ohio; Adrian Baish, Allied Properties, San Francisco, Cal.; R. E. Johnson, United Autographic Register Co., Oakland, Cal.; H. M. Baxter, The Texas Pipe Line Co., Okmulgee, Okla.; M. D. Daeschner, Shell Petroleum Co., Houston, Texas; G. Hall, Windsor Mfg. Co., Windsor, Vt.; B. F. Brady, Pepperell Mfg. Co., Biddeford, Maine; A. B. Mayne, International Silver Co., Meriden, Conn.; Arthur Seserman, Metal Trades Association, Boston; H. Rhoades, Manufacturer's Committee, Camden, N. J.; Norman Huff, Ford Instrument Co., Long Island City, N. Y.; W. E. Lunger, American Can Foundry Co., Huntington, W. Va.; John Crock, Wheeling Steel Corp., Wheeling, W. Va.; F. B. Fitsmorris, Washburn Crosby Co., Kansas City, Mo.; E. G. Stephenson, Maytag Co., Newton, Iowa.

Vanadium-Alloys Finds Tungsten Supply Ample

VANADIUM - ALLOY STEEL CO., Latrobe, Pa., has a supply of tungsten ore which is ample to take care of any possible demand for high speed steel, Roy C. McKenna, president, this week told stockholders. "Not in recent months," he said, "has the outlook for the tool steel industry been as bright as now."

Imports at Philadelphia

PHILADELPHIA—The following iron and steel imports were received here during the past week: 100 tons of manganese ore from Soviet Russia; 17 tons of wire rods, 23 tons of steel tubes and 14 tons of steel bars from Sweden.

Steel Plants Reemploy Many Men; Skilled Labor Shortage is Seen

PITTSBURGH — For the time being at least increased labor requirements in Pittsburgh district steel mills are being drawn from ranks of furloughed employees as well as additional worked time for those already on the payroll. Since Aug. 1, about 9000 steel workers have been recalled in this district. The rate of new additions is slowing up slightly so that probably less than 5000 additional men will be given employment over the next several weeks. Up to the end of this week U. S. Steel Subsidiaries will have recalled approximately 5000 employees in this district since Aug. 1. Jones & Laughlin Corp. has taken back about 1600 wage earners since that time.

In a few cases skilled workers have been taken on who have not been employed for a long time. Many of the furloughed workers have not been on the payroll of any steel company since 1936-37. The bulk of the additional steel workers' employment will probably center in blast furnace and by-product coke department since open hearth and finishing mill crews are fairly well rounded out at today's production rates.

Captive mines owned by steel companies have recalled close to 6000 workers recently to reopen mines in districts surrounding the Pittsburgh area. This number is not included in the estimate given above covering reemployed steel workers. Although work loads have been increased, there is still no official intimation as to when major steel companies will restore the 10 per cent and in some cases 16 2/3 per cent salary time cuts given to white collar workers some time ago.

Chicago Employment Higher

CHICAGO—Since Labor Day approximately 3000 men have been called back to work in Chicago district steel mills. Many thousands more have had the length of their work-week increased so that today nearly all of the 60,000-odd men employed in the steel industry here are working the full five-day week. Relatively few new names are being added to payrolls as virtually all of the men have been kept on the list from the time they were laid off, in some cases as long ago as a year.

In allied industries, fully 18,000 men are employed in the Chicago area, and this number will be swelled in the immediate future.

If business continues to come in at the rate of the past two weeks, capacity operations are expected for steel plants, and it is considered likely that employment will be given to an additional 3000 men at least, including the increases probable as a result of greater activity in railroad car construction, and general metal-working plants.

Last week many steel white collar employees worked nights and over the week end, attempting to straighten out the flood of orders which poured in during the week, only to find the mail this week no lighter than last. Thus far, the tendency has been to pay overtime rather than to put on new office workers.

Skilled Labor Shortage

DETROIT—Detroit industry, already undergoing a powerful seasonal acceleration in business and industrial employment, is gaging the probable effects which war will have in further stimulating business and putting men back to work. People intimately acquainted with employment problems predicted rapid absorption of unemployed and possible dissolution of WPA and PWA.

As regards the automobile industry itself, this branch of business is undergoing a normal seasonal pick-up which has been greatly stimulated by prospects of a better-than-average automobile year. A corresponding pick-up has been felt by the automobile parts manufacturers and suppliers. However, it must be emphasized that these are purely peace-time activities. The gain in employment from this source alone has been remarkably sharp, starting shortly after the seasonal low point was reached July 31 when the Detroit Board of Commerce Index of Industrial Employment dropped to 59.5 (Index base, 1923-1926 equal 100). Within two weeks the index had jumped to 65.0 and by Sept. 1 had reached 89.4.

Included in this was an increase in employment in some of the parts plants which are sources of supply for the aircraft industry. For two or three months the demand for airplane parts has been on the increase.

Meanwhile, the Procurement Division of the Army is hunting for large office space in Detroit and is considering the rental of as much as a whole floor of one building. Detroit industrialists understand that an elaboration of the industrial mobilization program is to be launched immediately.

Orders are expected and some inquiries have already been forthcoming for machine tool companies in this area, so these firms, along with many others, are already fearful of a shortage of skilled workers.

In the aircraft field on the West Coast, apprentice schools are already attempting to provide more trained shop men, but there is a distinct shortage of good engineers, with openings for at least 1000 of these unfilled at present. One firm alone is seeking 300 engineers, draftsmen and executives.

Five and Half Day Week Not Fully Restored

CLEVELAND—Payrolls are much heavier in the Cleveland and Youngstown districts but instead of taking on additional men, steel producers in those areas have been putting part-time men on full time, lengthening hours, and where necessary, paying overtime. Unemployment insurance regulations and similar laws have quite definitely made producers reluctant to hire marginal workers until absolutely unavoidable.

Regarding salaried employees, most companies which have been on a five-day week are returning to the 5½-day week at present only in individual cases. Where advisable for clerical or other salaried employees to work the extra half day, due to the rush of business, this is permitted but these cases are handled as overtime which results in the same 100 per cent pay for the individuals, but can be cancelled by the company quickly should conditions become slack again.

The current boom in the steel industry is greatly assisting employment in transportation fields. Truck lines, railroads and steamship companies have augmented their operating forces heavily. Railroad car shops have been rehiring at a fast rate.

Larger U. S. Merchant Marine, British Convoy System to Ease Export Difficulties

WITHDRAWAL of foreign ships for war service has caused considerable inconvenience to shippers but will not leave American export goods rusting and rotting on the piers as at the beginning of the first World War in 1914.

With new developments in Europe coming in quick succession, traffic departments of steel export offices in New York continue to operate on an hour to hour basis. This week there were no official changes in freight rates but insurance rates still are edging upward and are being quoted only in connection with a specific sailing.

Meanwhile the rigorous self-imposed censorship which cloaks most major ports in the United States has added to shippers' difficulties. Code is prohibited in cables and only specified languages may be used. Shippers are prohibited from indicating the exact time of a ship's departure in cables because of submarines.

British Convoys Awaited

During the past week shipments of steel abroad have been carried out with restricted volume, a condition which will persist until Great Britain is able to bring its system of convoying of merchant ships by naval vessels to full effectiveness. While war risk rates fluctuate from ship to ship the average rate last week to French ports was $3 per $100 of valuation. To South American ports, the rate on American flag ships was around 25c. per $100. On neutral bottoms it was 50c., while on English, French or Polish boats it was $3. German merchant ships apparently have been swept from the seas.

At the close of the past week, insurance underwriters reduced war risk rates to Continental ports to $2.50 per $100 of valuation for American boats not touching belligerent ports and to $3.75 on neutral boats. Neutral boats stopping belligerent ports carry a $5 rate. The rate of French, English and Polish bottoms to the Continent was set at $7.50. Rates on American boats engaged in coastwise trade was cut to 5c. per $100 from 10c. previously.

A rough estimate of costs of shipping a ton of billets to France would include the following items (assuming a price of $40, Pittsburgh, and ignoring effects of exchange rates): price of billets at Pittsburgh, $40; freight to ship at New York, $6.27; freight charge to French port, $9; war risk insurance, $1.60, and cargo insurance, 25c., or a total of $57.12, an increase of 42 per cent over the original price of the material.

A survey of the shipbuilding industry indicates that since the World War about one-third of the nation's foreign commerce has been carried in American ships and that the building of the new American merchant marine is well under way. In 1914 only 9.7 per cent of its foreign commerce was carried in U. S. vessels.

Industry More Efficient

"During the World War period, from 1914 to 1918, the number of workers engaged in the private American shipbuilding industry was multiplied about eight times," H. Gerrish Smith, president of the National Council of American Shipbuilders, says. "The building speed required after the spring of 1917 and the development of inexperienced men in the shipbuilding trades naturally led to some inefficiencies. The country got good ships, however, which at the peak were being delivered at the rate of 150 a month.

"Ships now being built are vastly different from those built during World War days or even those built ten years ago," Mr. Smith said. "The cost of ships has increased enormously in recent years not only in the United States but throughout the world, due to numerous factors largely beyond the control of the shipbuilder.

"Costs are controlled largely by the labor rates in American yards, which are the highest shipbuilding rates paid in the world, and costs of material, which also reflect the higher American wage scales.

Ships More Efficient

"The efficiency of vessels themselves has been improved greatly over vessels of twenty years ago, not only in their form, which permits them to be driven through the water with less horsepower for the same size and speed, but also in the design of machinery that will now develop a horsepower at a much lower fuel consumption. The weight, space and fuel consumption for the machinery installation are now approximately one-half of the values for the ships built during the World War period. Cargo cubic capacity and deadweight of ships of the same size and speed are very much greater due to the foregoing and to welding.

"Welding has now been adopted by virtually all American shipyards building ocean going tonnage and has proved one of the outstanding developments since the introduction of iron ships nearly a century ago. Welding has reduced the net weight of a vessel, possibly from 10 to 15 per cent, and it is anticipated that greater experience with welding will also reduce labor costs. In the adoption of welding the American shipyard is far ahead of shipyards elsewhere throughout the world. Because it leads to a lighter ship, welding means more cargo for a given displacement.

Once a Million Rivets

"The cargo vessel of simple design constructed during the World War period may have had as many as 1,000,000 rivets, depending on its size. Any one of these rivets, if damaged in operation, was a potential source of trouble. Welding is already limiting sharply the number of rivets in a large percentage of the vessels being constructed, and in some cases it has eliminated virtually all of them. This is the case with oil tankers and to a large degree with passenger vessels, as well as with cargo ships.

"The introduction of welding has eliminated much shop equipment and pneumatic tools required for a riveted ship and has emphasized the desirability of handling facilities of greater capacity in the shipyard, so as to permit the assembly and the complete welding in the shop or on the ground of large units of ship construction material, doing away with the old building practice of assembly bit by bit and the elimination of much of the work that had to be done in the air on scaffold. Better methods of planning and the moving forward of materials from storage yards to shop and ship in an orderly manner have been important steps in economical and expeditious construction.

"The building of naval vessels for several years past and the building of commercial vessels for the Maritime Commission and private operators during the last two years have permitted the shipyards to strengthen their organizations so that at the present time they are in a position, both as to equipment and personnel, to continue to meet any probable demands."

We Can Stay Out of War . . .

AMERICAN industry hates war.

War destroys lives. War wrecks homes. Economic chaos and years of crushing depression are its inevitable aftermath. It imperils representative democracy. Free institutions are among its early victims. Ultimately no one can escape the ruin of war.

American industry wants peace. Peace is the life blood of progress. Peace must be the national objective.

Industry's position on this matter has been stated repeatedly and there must be no misunderstanding about it.

The United States can stay out of war.

Emotionalism can betray us into war.

A public will to peace, coupled with wise public policies and affirmative action to this end by our government will keep us out of war. A fatalistic attitude that war is inevitable for us is absurd. It presupposes that America cannot conduct itself intelligently to preserve peace and its own interests.

Europe's problems do affect us, but our domestic problems still must come first.

If yesterday industry was the only source of prosperity and reemployment, today it is as well the keystone of preparedness and peace. Under any conditions, America must depend on a smoothly functioning, efficient industrial system.

Manufacturers will not relax their efforts to achieve and maintain sound improvement in our domestic economy.

Industry opposes profiteering—the utilization of war psychology to boost prices for the purpose of making excessive profits.

As manufacturers we recognize it to be our responsibility and moral obligation to conduct our businesses so that the prices of the products we produce and sell are related equitably to production costs.

We pledge our energetic support to this policy.

The N.A.M. calls upon all its members to exercise vigilance against any price or profit policies not justified by actual cost and anticipated cost of replacement.

Months ago this association said: "No sensible person believes that profit can come out of the wreckage of human life and economic dislocation."

The use of this crisis as an excuse either to extort unjustifiable profits or to pursue partisan political objectives is not only indefensible and dangerous, but reprehensible morally. Nor should pleas of "emergency" be utilized as an excuse for reaching objectives which the American people would not otherwise sanction.

The present situation calls for agreement on common objectives, but the democratic process of consultation and criticism must never be abandoned. Otherwise, we shall be following in the footsteps of those who believe in government by coercion.

In a world distraught by force the best way to preserve representative democracy is to practise it.

(The above statement, outlining American industry's position on peace and war, was issued Sept. 18 by the National Association of Manufacturers through Howard Coonley, the association's president.)

REINFORCING STEEL

. . . Awards of 13,700 tons; 9325 tons in new projects.

ATLANTIC STATES

AWARDS

3000 Tons, Lackawack, N. Y., dam, Contract No. 340, to Bethlehem Steel Co., Bethlehem, Pa.; Mason & Hanger, contractor.

2400 Tons, Charlestown, Mass., housing project, to Northern Steel Co., Boston; John Bowen Co., Inc., Boston, contractor.

400 Tons, Rutherford, N. J., sewage treatment plant to Jones & Laughlin Steel Corp., through Fireproof Products Co.; F. W. McGraw & Co., contractor.

300 Tons, Knightsville, Mass., Westfield River Dam, to Bethlehem Steel Co., Bethlehem, Pa.; George M. Brewster, contractor.

265 Tons, Pittsburgh, U. S. Engineers, War Department, Loyalhanna Dam on Loyalhanna Creek, near Saltsburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; Great Lakes Dredge & Dock Co., contractor.

261 Tons, Queens, N. Y., including 75 tons mesh, highway bridge, project MS-39-15, to Seaboard Steel Products Co., New York; through Federal Construction Co., New York.

200 Tons, Philadelphia, Stefano Brothers building, to American Engineering Co., Philadelphia.

152 Tons, Bar Harbor, Me., Arcadia National Park to Bethlehem Steel Co., Bethlehem, Pa.; W. H. Hinman, Inc., North Anson, Me., contractor.

125 Tons, Barrington, R. I., bridge, to Bethlehem Steel Co., Bethlehem, Pa.; Frank T. Wescott, North Attleboro, Mass., contractor.

115 Tons, Brooklyn, Midwood High School, to Seaboard Steel Products Co., New York; through Federal Construction Co., New York.

100 Tons, Queens, highway project SC-39-14, to Seaboard Steel Products Co., New York; through National Excavation Corp., New York.

CENTRAL STATES

700 Tons, Menasha, Wis., Marathon Paper Co., to Inland Steel Co.; Permanent Construction Co., contractor.

WESTERN STATES

1500 Tons, Alemeda, Cal., Navy base power house and warehouse, to Ceco Steel Products Co., San Francisco; through K. E. Parker Co., San Francisco, contractor.

1400 Tons, Enumclaw, Wash., Stevens Dam, to Northwest Steel Rolling Mills, Seattle; through Guy F. Atkinson, San Francisco, contractor.

915 Tons, Fort Peck, Mont., United States Engineer (Invitation 631-40-56 as follows: 740 tons to Inland Steel Co., Chicago; 175 tons to Sheffield Steel Corp., Kansas City, Mo.

405 Tons Calexico, Cal., All American Canal, drop No. 3 power plant, to Consolidated Steel Co., Los Angeles; through Charles W. Pettifer, Long Beach, contractor. Tonnage includes plates, pipe and rail.

255 Tons, Piru, Cal., bridge, to Blue Diamond Corp., Los Angeles; through J. S. Metzger & Son, Los Angeles, contractor.

250 Tons, Everett, Wash., East approach to Snohomish River bridge, to Bethlehem Steel Co., Seattle; through Howard S. Wright, Seattle, contractor.

200 Tons, Bonneville, Ore., to Grand Coulee Dam, Wash., transmission tower footings, to Bethlehem Steel Co., Seattle; through Fritz Ziebarth, Vancouver, Wash.

172 Tons, Bramwell, Idaho, Boise project (Invitation 21148-A), to Bethlehem Steel Co., San Francisco.

152 Tons, Cody, Wyo., Shoshone project (Invitation 48214-A, to Judson Steel Co., Oakland, Cal.

150 Tons, San Francisco, additional tonnage Federated Metals Division plant, to Soule Steel Co., San Francisco.

118 Tons, Santa Rosa, Cal., Sonoma County list, to W. S. Wetenhall Co., San Francisco.

117 Tons, Alameda, Cal., Navy base roads and services, to Ceco Steel Products Co., San Francisco; through Eaton & Smith, San Francisco, contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1100 Tons, Pittsburgh, Municipal Hospital, Fleisher Engineering & Construction Co., Buffalo, low bidder; Metsger & Richardson, contractors.

500 Tons, Wilkes-Barre, Pa., Kingston culvert, U. S. Engineers.

300 Tons, Cincinnati, Mount Washington reservoir.

290 Tons, Washington, indoor arena, Capitol Garden Co.

165 Tons, Milton, Mass., State road; De Matteo Construction Co., Roslindale, Mass., contractor.

120 Tons, West Stockbridge, Mass., State road; M. Pandolf Co., Needham, Mass., contractor.

120 Tons, Rensselaer County, N. Y., highway project R.C. 4072; J. J. Belotte & Son Contracting Co., Troy, N. Y., low bidder.

108 Tons, Montville, N. J., bridge over Passaic River on route 6; bids close Sept. 29.

CENTRAL STATES

640 Tons, Tell City, Ind., flood wall; Parker Construction Co., Cincinnati, low bidder.

185 Tons, Cleveland, Lake front ramp at east approach of Main Street bridge; bids Sept. 22.

WESTERN STATES

4350 Tons, Redding, Cal., Central Valley project (Invitation 33333-A); bids Sept. 22.

445 Tons, Woodland, Wash., Lewis River bridge; bids Sept. 26.

317 Tons, Mare Island, Cal., paint shop and storage; bids Oct. 4.

197 Tons, Odair, Wash., Grand Coulee Dam and pumping plant (Invitation A-38479-A; bids in.

155 Tons, Oregon City, Ore., viaduct; bids Sept. 28.

109 Tons, King County, Wash., three bridges on State highway 15; bids Sept. 26.

103 Tons Los Angeles, First and Beverly grade separation over Glendale Boulevard; bids Oct. 4.

100 Tons, Fresno, Cal., highway work; bids Oct. 4.

. . . PIPE LINES . . .

Bridgeport Gas Light Co., 815 Main Street, Bridgeport, Conn., plans extension in pressure pipe lines for gas transmission to Long Hill district, about five miles, with distributing pipe lines in latter area. Work is scheduled to begin soon and will be carried out by company forces.

Shell Union Oil Corp., 50 West Fiftieth Street, New York, plans new 6-in. welded steel pipe line in company territory in New England, exact locality not as yet announced, for gasoline transmission, requiring about 4500 tons of pipe. Award for pipe has been divided among National Tube Co., Jones & Laughlin Steel Corp., and Pittsburgh Steel Co.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Sept. 26 for steel pipe and fittings (Circular 122); until Sept. 28 for steel pipe, soil pipe, iron pipe, pipe fittings, etc. (Circular 123).

Eunice, La., has let contract to Littrell Contracting Co., Opelousas, La, for steel pipe line system for municipal gas distribution, including main welded steel pipe line for connection with supply source, at $52,689.

Trinidad, Colo., plans steel pipe line for main water supply for municipal reservoir to city, replacing present wood stave pipe. Cost estimated at $29,000.

Standard Oil Co. of Ohio, Midland Building, Cleveland, has begun new 6-in. welded steel pipe line from Springfield, Ohio, to connection with present system, about 24 miles, for gasoline transmission.

Rio Gas & Power Co., Maverick Building, San Antonio, Tex., has asked bids on 3-in. welded steel pipe line from San Angelo, Tex., where connection will be made with present main pipe line and station, to Sonora, Tex., about 22 miles, for natural gas transmission for distribution at latter place.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., Col. T. A. Liesen, secretary, plans pipe lines for gas distribution in district No. 871, recently created.

Union Gas Co., Ltd., 227 North Front Street, Sarnia, Ont., plans welded steel pipe line from Sarnia to Tilbury, Ont., for gas transmission for distribution at latter place, and will carry out work with company forces. Cost close to $40,000.

Tacoma, Wash., will open bids Sept. 25 on 7945 ft. of 30-in. steel pipe and 1325 ft. of 18-in. cast iron pipe.

CAST IRON PIPE

Waltham, Mass., has awarded a round tonnage of 6 and 8-in. pipe to Warren Foundry & Pipe Corp.

City Council, City Hall, Altoona, Pa., Earl E. Stall, director of public property, closes bids Sept. 27 for 650 ft. of 20-in., 650 ft. of 16-in., 1600 ft. of 12-in., 1200 ft. of 10-in., 9500 ft. of 8-in., 8400 ft. of 6-in., and 2500 ft. of 4-in. for water system; also for 60,000 lb. of special fittings for cast iron water mains.

Board of Public Affairs, Oak Harbor, Ohio, will ask bids early in October for pipe lines for water system; also for booster pumping station. Champe, Finkbeiner & Associates, Nicholas Building, Toledo, Ohio, are consulting engineers.

Riveria, Fla., plans pipe lines for water system. Special election has been called on Oct. 10 to approve bonds for $60,000 for this and other waterworks installation.

Summerfield, Kan., plans pipe line extensions in water system and other waterworks installation. Cost about $36,000. Paulette & Wilson, 1006 Kansas Avenue, Topeka, Kan., and Farmers' Union Building, Salina, Kan., are consulting engineers.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 25 for 15,000 ft. of cast iron water pipe (Schedule 3603).

Bernie, Mo., plans pipe lines for water system and other waterworks installation. Cost about $70,000. Russell & Axon, 4903 Delmar Boulevard, St. Louis, are consulting engineers.

Granton, Wis., closes bids Sept. 25 for 2000 ft. of 8-in., and 8000 ft. of 6-in. for water system; also for pipe fittings and specials. General Engineering Co., Portage, Wis., is consulting engineer.

Water Department, Wichita, Kan., closes bids Sept. 29 for water pipe, fittings, specials and accessories (Contract No. 4), estimated cost $1,083,000; pressure relief valves, including installation of control and operating equipment (Contract No. 5), estimated cost $41,000; 174,500 ft. of 14 to 48-in. water pipe, with fittings, specials, valves and accessories (Contract No. 6), estimated cost $275,000; general construction of water filtration plant (Contract No. 7), estimated cost $392,000; filter plant equipment (Contract No. 8), cost $96,000. Entire project will cost about $2,485,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Centerville, Tex., plans pipe line extensions in water system; also 50,000-gal. elevated steel tank and other waterworks installation. Fund of $54,545 is being arranged for this and sewer system. Garrett Engineering Co., Houston, Tex., is consulting engineer.

Fresno, Cal., has awarded 443 tons of 4, 6, 8, and 10-in. pipe to American Cast Iron Pipe Co., San Francisco.

Whittier, Cal., has opened bids on 265 tons of 6, 10 and 24-in. pipe.

San Diego, Cal., will open bids Oct. 3 for constructing Upas Street pipe line involving 9600 ft. of 30-in. pipe (cast iron, steel, reinforced concrete and asbestos cement alternates).

Newport Beach, Cal., will open bids Oct. 2 on 100 tons of 6 and 8-in. pipe.

Lynwood, Cal., has awarded 16,000 ft. of 6-in. and 3200 ft. of 8-in. pipe to National Cast Iron Pipe Co., Los Angeles.

Sunnyside, Wash., plans pipe line extensions in water system, including second main feed line from city reservoir, which will be increased in capacity from 250,000 to 1,000,000 gal. Cost about $90,000.

Santa Rosa, Cal., plans about 30,000 ft. of 6 to 12-in. for water system, larger size to be used for new main feed line from proposed 1,000,000-gal. water reservoir. Special election has been called Oct. 24 to vote bonds for project.

. . . GREAT BRITAIN . . .

. . . *New business virtually suspended under licensing arrangements.*

LONDON, Sept. 19 (*By Cable*)—New business in iron and steel in Great Britain is virtually suspended since the institution of the licensing system, but consumers are generally already well covered by previous contracts which exempted them from licenses.

Export business is generally idle. Pig iron supplies are ample, with buyers eager to take all that is available. There is an insatiable demand for scrap.

Many of the existing Steel Cartel arrangements have gone by the board, but it is still too early to affirm that the whole system is certain to collapse. Britain is still importing material from France and Belgium under previous arrangements, and close contact is maintained with those countries.

Nothing is known here about a reported Anglo-French committee to buy American steel. Luxemburg works are operating at a reduced rate. The steel industry outlook in Belgium is more hopeful as ore and labor problems have been provisionally solved though transport is still difficult there.

This Week on the Assembly Line

(CONCLUDED FROM PAGE 63)

Ford is definitely reported as not a potential buyer.

Lower Prices on Automobiles

Regardless of possible increases in prices of materials and labor, the automobile industry continues to offer lower prices on 1940 models. The 1940 Dodge passenger car models showed decreases up to $15 on three comparable models. Prices on other Dodge models for 1940 are unchanged. Nash announces that prices for 1940 will be from $20 to $50 lower than 1939 prices.

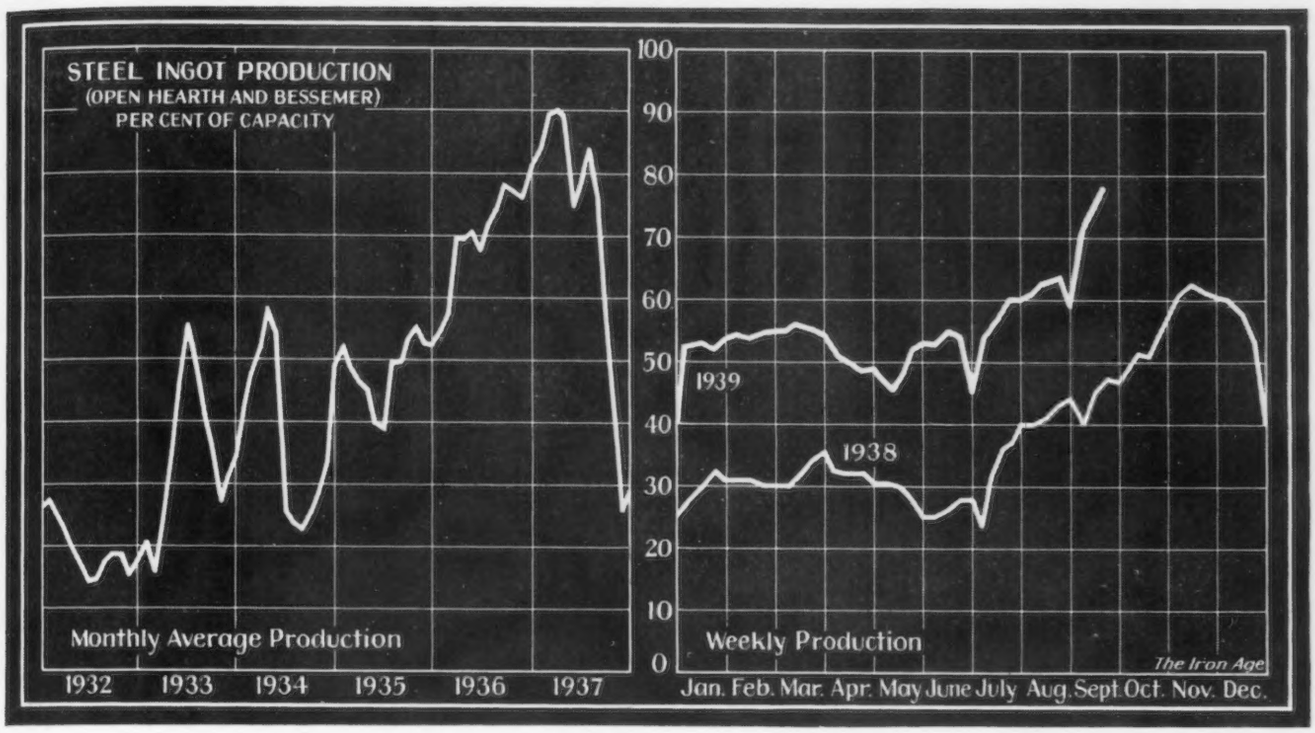
Preview of new Oldsmobile models was held a week ago, with the first exhibition and demonstration of the hydramatic drive, which incorporates a fluid flywheel and a full automatic transmission. There is no clutch or clutch pedal in the cars. The equipment will be optional. Detailed announcements are being withheld by Oldsmobile until the cars are released to the public.

Strike Situations Serious

NLRB elections continue to bring victories to UAW-CIO. Briggs Mfg. Co. employees cast more than 15,000 ballots (21,000 were eligible) and the CIO received more than 13,000 of the votes.

Meanwhile, the UAW-CIO carried out its threats to close seven additional plants of the Bohn Aluminum & Brass Corp. in its attempt to force the union shop on the Detroit bearing industry. Now 10 plants are closed and 4000 employees are idle. The strike affects Bohn, Federal-Mogul Corp. and Detroit Aluminum & Brass Corp. The three companies manufacture a large portion of the bearings used in the automobile and airplane industries. It is feared that automobile plants will begin to feel the pinch of the strike in 10 days. However, the major fear of parts manufacturers, automobile companies and the aircraft industry, as well as the Federal Government in this emergency, is that CIO demands for a closed shop will be extended and seriously interfere with necessary defense programs.

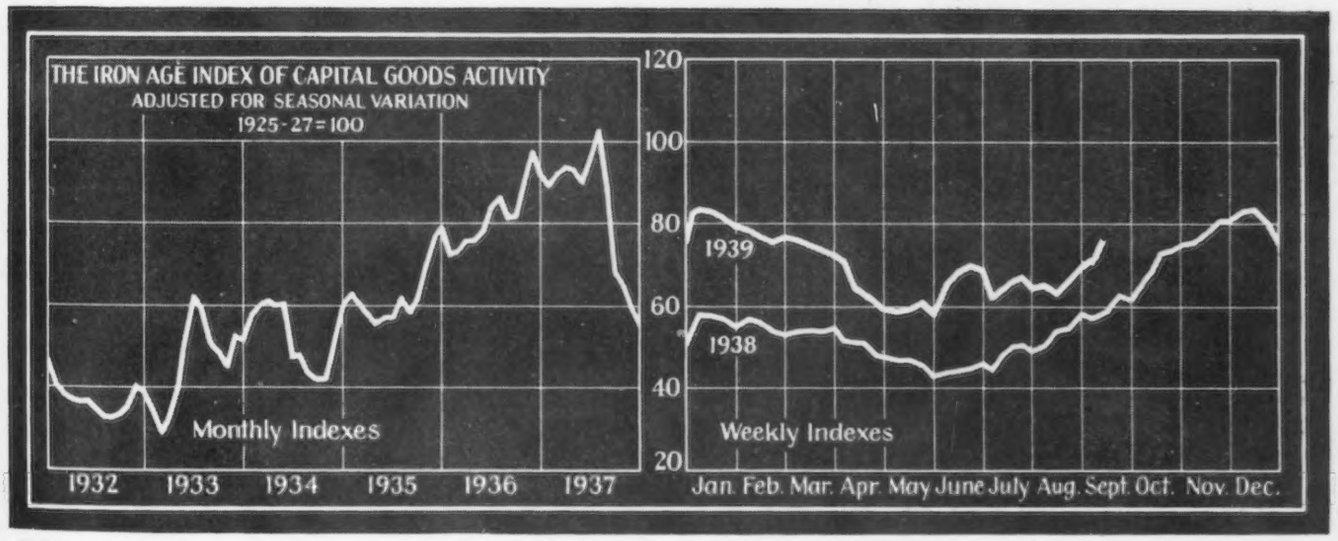
Ingot Rate at 79%, Highest Since September, 1937


STEEL INGOT PRODUCTION
(OPEN HEARTH AND BESSEMER)
PER CENT OF CAPACITY
Monthly Average Production
1932 1933 1934 1935 1936 1937
100 90 80 70 60 50 40 30 20 10 0
1939
1938
Weekly Production
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	75.0	78.5	85.0	58.0	83.0	73.5	85.0	97.0	82.0	71.0	54.0	56.0	75.0	**79.0**
PREVIOUS WEEK..	69.0	67.0	74.0	51.0	82.0	66.0	78.0*	97.0	82.0	62.5	54.0	52.0	75.0	**71.0**

* Revised.

Index Rises Six Points to Eight-Month Peak


THE IRON AGE INDEX OF CAPITAL GOODS ACTIVITY
ADJUSTED FOR SEASONAL VARIATION
1925-27=100
Monthly Indexes
1932 1933 1934 1935 1936 1937
120 100 80 60 40 20
1939
1938
Weekly Indexes
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

RESUMPTION of activities on a full-time basis after the holiday found most of the heavy industries covered by THE IRON AGE capital goods industry operating at a pace substantially above the pre-holiday level. This faster tempo resulted in a rise of six points in the index to 79.8, the highest position reached in nearly eight months. The week's sharpest advance was recorded by the steel component which moved up 15.7 points to 105.4, the highest index number reached in two years. The automobile factor was also sharply higher as assemblies gained over 50 per cent in the week. A sharp expansion also occurred in the Pittsburgh component which now stands at the highest point since October, 1937. The only component that failed to gain was the heavy construction factor. Despite the current low level of construction awards, the total for the year to date is 15 per cent over the like period of 1938.

	Week Ended Sept. 16	Week Ended Sept. 9	Comparable Week 1938	Comparable Week 1929
Steel ingot production[1]	105.4	89.7	64.6	118.8
Automobile production[2]	81.4	70.4*	48.0	111.4
Construction contracts[3]	65.7	66.7	71.0	104.2
Forest products carloadings[4]	60.6	59.3	53.9	119.7
Production and shipments, Pittsburgh District[5]	85.7	82.9	55.3	122.6
Combined index	**79.8**	**73.8***	**58.6**	**115.3**

*Revised.

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record*; 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Steel companies applying restrictions, allocating tonnage.

° ° •

. . . Railroad buying movement comes on top of other heavy demands.

° ° •

. . . Steel prices reaffirmed, pig iron up $2, scrap soars.

THE reaffirmation of steel prices for the fourth quarter by the leading producer, subject to completion of shipments by Dec. 31, has allayed the fears of buyers of a precipitate advance, but has barely checked the heavy flow of orders to the mills. The expectation that rising costs will force some steel companies to charge higher prices before the year end is causing steel users to protect themselves to the fullest possible extent.

Should higher prices come for the first quarter or sooner, steel companies would undoubtedly have difficulty in shipping all of the business on their books by Dec. 31. To guard against such a contingency, restrictions are being more forcefully applied. Some companies have allocated certain tonnages of each product to their various district offices, holding district sales managers responsible for the careful distribution of available material on the basis of customers' known requirements so that the booking of speculative orders may be avoided.

Some mills are already sold out for the remainder of the year, particularly on sheets, which have been in heaviest demand because of full specifications against the low-priced commitments of last May. However, there have also been heavy bookings of bars, semi-finished steel, tin plate and wire products, with substantial increases in all other products. The avalanche of orders has so greatly swamped the operating and clerical forces of the steel companies that some of them may not know definitely for another week or two just what their delivery situation will be over the remainder of the year. In order not to disappoint too many customers, some mills are now accepting orders for some products with the understanding that shipment shall be made at mill convenience.

OWING to the inability of operating departments to make definite delivery promises at the moment, the export departments of some of the larger companies are holding off the acceptance of further export orders until they have a clearer picture as to whether these can be filled without conflicting with domestic business. Although export bookings have been small in comparison with domestic orders, the total sold for export since the first of the month is estimated to be well above a half million tons. Negotiations are in progress with the British for the sale of 200,000 tons of semi-finished steel.

Coming on top of an already heavy steel demand are rapidly expanding requirements of the railroads for new cars and locomotives, repair parts and materials and track materials. Canadian railroads, which have a $25,000,000 program, may be forced to place some orders in the United States. Rail purchases total more than 100,000 tons, with about 50,000 tons in the offing. Repair programs embrace many thousands of cars, while inquiries have appeared for more than 11,000 new cars.

While the continuance of present steel prices into the fourth quarter by the leading producer has met with the approval of buyers and other sellers, there is a belief in the trade that some of the smaller mills, which are immediately faced with much higher costs, will quote premium prices before the end of the next quarter. Scrap has been advancing so rapidly as to be an acute problem, particularly for those whose financial condition has not permitted the laying in of large inventories.

This week's advance in THE IRON AGE scrap composite price is $2.50 a ton over last week, one of the greatest weekly gains on record, bringing this average up to $19.25, and more than $5 over the low point of $14.08 on May 23. The Pittsburgh price for No. 1 heavy melting steel has gained $3.50 over last week to a range of $21.50 to $22, the Chicago price is up $2.25 to $17 and the Philadelphia quotation is $1.75 higher at $19. The scrap situation is changing almost hourly and quotations may be higher before the end of the week. The shortage of No. 1 steel scrap is accentuated by the fact that stocks are being withheld from sale by many yard dealers and accumulators.

Other price advances include $2 a ton on all grades of pig iron in all districts and $1 or more on beehive furnace coke. Connellsville ovens, long idle, are being refired to take care of expanding requirements of blast furnaces and foundries.

A number of steel company and merchant blast furnaces have gone into blast within the past week and others are scheduled for resumption this week. Ingot production, which for this week is estimated at 79 per cent, a gain of eight points over last week, is scheduled for a further gain as soon as additional blast furnace capacity has been made ready. Some steel plants are now working at full capacity.

Steel plant employment has gained rapidly. A shortage of skilled workers has developed in some of the highly technical trades, including airplane and machine tool manufacture.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Sept. 19, 1939	Sept. 12, 1939	Aug. 22, 1939	Sept. 20, *1938
Rails, heavy, at mill	$40.00	$40.00	$40.00	$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:	Sept. 19, 1939	Sept. 12, 1939	Aug. 22, 1939	Sept. 20, *1938
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.40	2.40	2.40	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.25	3.25	3.25	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	‡$5.35

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:	Sept. 19, 1939	Sept. 12, 1939	Aug. 22, 1939	Sept. 20, *1938
No. 2, fdy., Philadelphia	$24.84	$22.84	$22.84	$21.84
No. 2, Valley furnace	23.00	21.00	21.00	20.00
No. 2, Southern Cin'ti	23.06	21.06	21.06	20.06
No. 2, Birmingham	19.38	17.38	17.38	16.38
No. 2, foundry, Chicago†	23.00	21.00	21.00	20.00
Basic, del'd eastern Pa.	24.34	22.34	22.34	21.34
Basic, Valley furnace	22.50	20.50	20.50	19.50
Malleable, Chicago†	23.00	21.00	21.00	20.00
Malleable, Valley	23.00	21.00	21.00	20.00
L. S. charcoal, Chicago	30.34	28.34	28.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	80.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Sept. 19, 1939	Sept. 12, 1939	Aug. 22, 1939	Sept. 20, *1938
Heavy melting steel, P'gh	$21.75	$18.25	$16.25	$15.25
Heavy melting steel, Phila.	19.00	17.25	16.25	14.25
Heavy melting steel, Ch'go.	17.00	14.75	13.875	13.25
Carwheels, Chicago	15.75	13.75	12.75	13.75
Carwheels, Philadelphia	19.50	17.25	16.25	17.25
No. 1 cast, Pittsburgh	22.25	18.25	15.75	15.50
No. 1 cast, Philadelphia	19.75	17.75	16.75	16.25
No. 1 cast, Ch'go (net ton)	15.75	13.75	12.75	12.75

Coke, Connellsville

Per Net Ton at Oven:	Sept. 19, 1939	Sept. 12, 1939	Aug. 22, 1939	Sept. 20, *1938
Furnace coke, prompt	$4.75	$3.75	$3.75	$3.75
Foundry coke, prompt	5.50	4.75	4.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Sept. 19, 1939	Sept. 12, 1939	Aug. 22, 1939	Sept. 20, *1938
Copper, Electrolytic, Conn.	12.00	12.00	10.50	10.375
Copper, Lake, New York	12.00	12.00	10.50	10.50
Tin (Straits), New York	Nominal	75.00	48.65	43.70
Zinc, East St. Louis	6.25	6.25	4.75	4.95
Zinc, New York	6.64	6.64	5.14	5.34
Lead, St. Louis	5.35	5.35	4.90	4.95
Lead, New York	5.50	5.50	5.05	5.10
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Sept. 19, 1939	2.236c. a Lb.	$22.61 a Gross Ton	$19.25 a Gross Ton
One week ago	2.236	20.61	16.75
One month ago	2.236	20.61	15.46
One year ago	2.286	19.61	14.25
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.	Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	$19.25, Sept. 19	$14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 9

. . . THIS WEEK'S MARKET NEWS . . .

NEW BUSINESS

. . . Substantial volume of orders still being placed

UP to Tuesday of this week specifications were still rolling into PITTSBURGH mills with Monday's tonnages in some cases exceeding those of any other day since the rush started. A substantial volume of business is still to be placed on order books, having backed up at district offices. A large part of this "protective buying" of course includes low priced sheet commitments made last May and also includes forwarded buying by bar customers under contract who are avoiding extra changes to go into effect Oct. 1.

Sheet specifications at PITTSBURGH disclosed the greatest bulge and are running from 200 to 400 per cent ahead of the amount booked during the same number of days in August. Running a close second to this experience are semi-finished steel specifications followed by hot rolled bar, wire, and tubular goods orders. There is little doubt that much of the present business is "protective" in the sense that consumers fear both extended deliveries and higher prices as an indirect or direct result of the European war situation. Meanwhile, the entire situation is being complicated from a delivery standpoint because of the increase in automotive specifications, the scramble from miscellaneous customers, the phenomenal increase in tinplate specifications, and the entry of railroads into the picture for substantial rail tonnages as well as freight car material. It is believed that some of the railroad buying today is "protective" buying, both from the standpoint of delivery and prices.

Though the price reaffirmation has made speculative buying unnecessary, there has apparently been very little slackening in the intense pressure being exerted on CHICAGO mills because of the extremely tight delivery situation. With some order departments three days behind in entering business, mills have no idea how far ahead they are sold, and in some cases are quoting price at time of shipment in order to be on the safe side should there be a first quarter price advance. Others, to discourage speculative orders of all sorts, are insisting on shipments at mill's convenience.

Orders have come in so fast that tabulation has been impossible to date but one CHICAGO sales office reports that tonnage is three times that of a month ago.

The Inland Steel Co., CHICAGO, in its fourth quarter price announcement, which was deliverd to customers Tuesday, prefaced the reaffirmed quotations with this statement, "Inasmuch as we are already heavily booked for the fourth quarter, particular attention is called to the fact that the prices listed herein apply only to tonnage shipped on or before Dec. 31, 1939. Orders which cannot be scheduled for such delivery will be accepted only on the basis of prices in effect at the time of shipment."

The outburst of buying, aside from its speculative nature, indicates clearly just how low consumers' inventories must have been throughout the summer. In addition to this general renewing of stocks, releases against all flat rolled commitments have been liberal and frequent, as buyers, especially in the automobile industry, seek to obtain the tonnages booked last May at bargain prices. Motor car makers, if they wish to get the low-priced steel they have on order, are being urged to place their specifications promptly, for fear the required Dec. 31 delivery may be impossible if they wait much longer.

Large orders are being received from railroads for the first time in many months. Sensing the possibility of heavy war-inspired traffic, the carriers are rushing to replace their equipment. At present, seven roads are known to be interested in a total of 11,300 cars and when this issue is delivered to its readers, additional inquiries probably will have been announced.

At CLEVELAND and YOUNGSTOWN, after a tumultuous buying period seldom paralleled in the history of those areas, the agitation is beginning to center upon the delivery situation, which is becoming increasingly acute. Production and transportation facilities quite plainly will be taxed for the rest of this year because of the universal insistence for quick shipment.

Some mills over the nation are booked to capacity for the remainder of this year in certain items. Other producers report their exact position undetermined due to the strong flow of business which has created jams in district offices. While demand for heavy products has been tremendous, at the same time incoming orders for tin plate and some of the other lighter items are up very sharply.

The demand for steel in PHILADELPHIA and NEW YORK continued unabated in the past week. Most steel users now are not content with merely having their requirements formally entered on order books; they are requesting immediate delivery, apparently preferring to store the material in their own yards rather than run the risk of possible delays in deliveries from the mills.

PRICES

. . . Steel quotations reaffirmed for fourth quarter subject to Dec. 31 shipment . . . Pig iron up $2

THE reaffirmation of present prices for fourth quarter shipments up to and including Dec. 31 by Carnegie-Illinois on Sept. 15 was specifically an attempt to allay consumer fears and to hold speculative buying in check. Contrary to some expectations, the volume of steel orders placed actually increased after this announcement was made and it is expected within the next two or three weeks that major steel companies will have booked all the steel they are physically capable of shipping by the end of December. For that reason, and because steel companies are trying to exercise as much control as possible over the speculative or protective nature of the current steel buying wave, it is more than likely that first quarter steel prices will be announced much sooner than is the usual practice. It may even be that such quotations for first quarter delivery will be made known to steel consumers within the next 30 or 40 days because by that time pressure for such knowledge from steel consumers will be terrific owing to the sold out conditions of steel producers.

That higher prices are likely to result for first quarter shipments is taken as a foregone conclusion in some quarters, although no definite information is available at this time. In this connection it is to be remembered that steel companies in June, 1938, lowered published steel prices as much as $6 a ton in order to meet competitive conditions and to stimulate demand. At that time labor did not share in this reduction in steel prices, hence it is probable that they would not be

expected to share in any increase in steel prices which might occur to bring the present published price level back or close to the one in existence previous to June, 1938. It is expected that if steel prices are advanced, such increases will only compensate for actual increased steel making cost.

The present flurry of business which must be shipped by the end of this year is forcing some high cost units back into operation. The reemployment of furloughed men who have been off the payroll for some time is also tending to increase steel making costs, to say nothing of sharp advances in raw materials which go into the making of steel.

Cold finished carbon bar producers have reaffirmed until further notice base prices, but have inaugurated extra and deduction changes reflecting changes made in the hot rolled carbon bar extra card last July.

Export prices on practically all steel products at the start of this week at least equal to domestic published quotations and in the case of semi-finished items premiums as high as $5 per ton over the domestic market have been reported, some companies quoting $45, f.a.s.

All grades of pig iron are up $2 per ton. Scrap markets continue to soar. Fuel oil prices have gone a little higher.

New higher prices have been issued on stove bolts and cap screws.

PIG IRON

. . . Prices advanced $2 a ton in all districts on all grades

ALL grades of pig iron in all districts were marked up $2 a ton last week. First announcements of higher prices came on Sept. 14 and were quickly followed. Before the advances, however, nearly all producers had covered their trade through the fourth quarter. There was a heavy buying movement which has taken some merchant furnaces virtually out of the market for the remainder of the year. A factor which added to the rush of orders was the insistence of furnaces at the outbreak of the war that all business on their books at prices below the then quoted levels be taken out at once. Some sales have been made at the higher prices now in effect.

Pig iron producers expect to ship as much iron as they can make between now and the end of the year. Additional merchant furnaces are being made ready for operation, and some have gone in during the week.

In the BIRMINGHAM district 17 of the 18 furnaces there are in blast. Sloss-Sheffield blew in its No. 4 stack on Sept. 16, and Woodward Iron put its No. 3 furnace in blast on Sept. 18. Sloss-Sheffield is now operating three of its four furnaces and Woodward has all three of its stacks in blast.

The Perry furnace at Erie, Pa., went into blast late last week. The Hanna Furnace Corp. blew in a second furnace at BUFFALO. The Sharpsville, Pa., furnace of the Pittsburgh Coke & Iron Co., will go into blast soon.

Steel companies which are preparing to put additional furnaces in blast include the Carnegie-Illinois Steel Corp., Republic Steel Corp. and Youngstown Sheet & Tube Co.

There is a large volume of export inquiry from Scandinavia, Holland, South Africa and China, but many furnaces are out of the export market because of overloaded order books. It is understood that Great Britain placed a large order early in the month at a price that appears to be low in comparison with present quotations. Export prices are now in line with domestic prices, or higher for special analyses.

The Wisconsin Steel Co. is preparing a second blast furnace to go into operation sometime within a week or 10 days. A third stack is being relined.

RAILROAD BUYING

. . . Heavier buying started for new equipment, repairs and tracks

RECENT contraseasonal gains in carloadings and anticipation of still greater activity have spurred railroads to action rehabilitating old equipment and buying new rolling stock. Jesse Jones, Federal Loan Administrator, reports that equipment purchases of the past 60 days total $125,000,000 and that completion of contemplated programs will result in expenditures of from $50,000,000 to $75,000,000. In Canada, the Government announced that new equipment costing $25,000,000 will be purchased shortly for use on the Canadian Pacific and Canadian National roads. While bulk of this Canadian business will be placed with Dominion car makers, it is expected that a sizable share will fall to equipment manufacturers in this country.

Outstanding among new programs announced recently is Pennsylvania's equipment and property improvement program which will involve close to $17,000,000. The road plans to build 2500 and repair 17,500 freight cars at its Altoona, Pa., yards, and will purchase 20 electric locomotives, 15 modernized passenger cars and three streamlined passenger trains. Building of the 2500 new cars will call for close to 30,000 tons of steel. Other new programs not yet out for bids include 2500 freight cars and 10 diesel-electric locomotives for Illinois Central; 1500 freight cars for Milwaukee Road and 1000 cars for Rock Island. Union Pacific has ordered material for 2000 lightweight freight cars. Tonnages involved in this purchase approximate 26,500 tons of sheets, plates and castings. Bids are being opened this week on 1000 cars for Norfolk & Western and a similar amount for Delaware & Hudson. Other new equipment inquiries are: 1500 cars for Elgin, Joliet & Eastern, 2000 cars for Bessemer & Lake Erie, 500 to 1000 box cars for Chicago, Rock Island & Pacific and up 25 hopper cars for Detroit, Toledo and Ironton. New York Central is taking bids on material required to build 500 freight cars.

Rail purchases have also spurted. The Pennsylvania has bought 50,000 tons, as part of its new $17,000,000 program. The tonnage is understood to have been allocated as follows: Carnegie-Illinois Steel Corp. 25,000 tons; Bethlehem Steel Co., 21,000 tons, and Inland Steel Co. 4000 tons. New York Central has placed orders for 2500 tons with Carnegie-Illinois Steel Corp., 2000 tons with Bethlehem Steel Co. and 500 with Inland Steel Co. Chesapeake & Ohio has purchased 32,000 tons, dividing the tonnage as follows: 17,280 tons to Carnegie-Illinois Steel Corp., 11,520 tons to Inland Steel Co. and 3200 tons to Bethlehem Steel Co. Atlantic Coast Lines placed 8500 tons with Tennessee Coal, Iron & Railroad Co., while a Brazilian railroad interest recently purchased 20,000 tons, dividing the order between Carnegie-Illinois Steel Corp. and Bethlehem Steel Co.

New rail purchases in the offing include 20,000 to 25,000 tons for Baltimore & Ohio and 25,000 tons for Norfolk & Western.

Youngstown & Northern, U. S. Steel subsidiary, is inquiring for 100 mill gondolas, and the Union Railroad, another subsidiary, is inquiring for 100 dump cars.

Baltimore & Ohio is inquiring for one thousand fifty ton hoppers, five hundred seventy ton gondolas, five hundred fifty ton box cars. Steel required will be about 25,000 tons.

SHEETS AND STRIP

. . . Some mills filled up to end of the year on sheets

SHEET and strip specifications at PITTSBURGH in the past week were in greater volume that at any time in the past year and a half. While a large part of the total represented the cleaning up of low priced tonnages, there was a substantial volume of business taken at current published prices. In some cases the amount of sheet bookings ran from three to five times in excess of those placed in the same period last month. Many producers are booked up to the end of the year on cold rolled sheets and have only a month, at the most, left open on hot rolled sheets. This means that orders will be turned down soon, as shipments not made by the end of December must take the price in effect at time of shipment. There are plenty of instances already where orders are being refused. Steel companies are, as far as possible, cutting orders down that suggest pure speculation.

If present trend of affairs continues, there is a possibility that first quarter prices will have to be announced much sooner than is usual so that consumers will know what price situation they face with regard to first quarter tonnages. Should present economic conditions continue, there is better than an even chance that new prices will be higher. In the past week tonnages from auto companies were substantial. Tank and boiler makers came second with barrel makers and miscellaneous customers running a close third and fourth. Sheet departments also face the possibility that steel will be allocated to them in a more restricted way than is now the case owing to the pickup in other steel sales.

Orders for sheets and strip have been received at CHICAGO sales offices in such volume that order departments are as much as three days behind in entering the business. Consequently the delivery situation is very confused and some business is being taken at price at time of shipment, in case deliveries extend into the first quarter of 1940. Liberal releases have been seen in the past week from the automobile industry and it is understood that tonnage requirements for the remainder of this year must be placed shortly if the required delivery before Dec. 31 is to be obtained. Turns at the Chicago sheet and tin mills of one plant are scheduled this week at 123 from 101 last week and are now in excess of what is considered normal operating capacity.

The delivery situation on sheets and strip is acute at CLEVELAND, YOUNGSTOWN and other OHIO production centers, especially on cold rolled. Sales of galvanized sheets have been heavy also. Under ordinary circumstances an announcement extending current prices would tend to slow down demand, but at present the foremost concern of consumers is getting on future rolling mill schedules.

Some companies have filled their order books for hot and cold rolled sheets and galvanized for delivery by Dec. 31 and have withdrawn from the market. On the other hand, other sellers through Monday had not sold a pound of material for delivery in the fourth quarter, but had determined regular customers' requirements and were preparing to allot tonnages on that basis. Many of the smaller producers are selling galvanized on the 3.50c. base for early delivery but for any deferred deliveries, such as November, the price at the time of shipment is to prevail. In general mills are taking care of their regular accounts by allocating tonnage.

Except for the very large producers, the demand of domestic consumers has been so great that little interest is being taken in the export market.

IRON ORE

. . . Great Lakes fleet expanded and ore shipments gain

BETWEEN Aug. 15 and Sept. 15, 34 vessels were added to the American freight fleet on the Great Lakes, according to the monthly report issued by C. C. Lindeman, statistician for the M. A. Hanna Co., Cleveland. Vessels in the ore trade increased from 206 to 258. The fleet, which consists of 303 boats at full strength, with aggregate trip capacity of 2,755,440 tons, is now the largest of any month since 1937. On Sept. 15, 1938, only 142 vessels were in commission, with 106 in the ore trade.

Consumption of Lake Superior iron ore during August totaled 3,775,132 gross tons, against 3,143,337 tons in July according to the latest report of the Lake Superior Iron Ore Association, Cleveland. Ore on hand Sept. 1 at Lake Erie docks was 4,349,279 tons, and at furnaces 28,365,093 tons a total of 32,714,372 tons. This total compares with 28,507,243 tons at furnaces and docks Aug. 1. There were 111 furnaces using Lake ore in blast Aug. 31 against 102 active July 31.

. . . COKE . . .

. . . Beehive furnace grade in demand advances in price

BECAUSE of the rapid increase in blast furnace production, by-product coke supplies are becoming tighter every day. As a result, a few contracts for fourth quarter requirements have already been placed with beehive coke producers. More of such orders are expected. While a few weeks ago close to 400 beehive ovens were in blast, the number has now risen to over 800; about 3000 are available, but the price of coke would have to be higher than it is now to bring these units in. Beehive furnace coke, f.o.b. Connellsville, is being quoted at $4.75 to $5 a ton as against $3.75 a few weeks. An anticipated increase in demand from merchant blast furnaces coupled with fill-in requirements from steel mills will undoubtedly bring higher prices.

REFRACTORIES

. . . Prices extended through fourth quarter . . . Demand much larger

PRESENT refractory prices have been extended to cover shipments made in the fourth quarter. Practically all companies have registered a tremendous pickup in orders in the past week and as a result operations at their plants will be stepped up accordingly. Most new business is for prompt shipment, especially that material for repairs on blast furnace equipment. Shipments during the next three months are expected to be as heavy as they were late in 1936 and early 1937.

COLD FINISHED BARS

. . . Prices reaffirmed subject to new extras and deductions

A PROMINENT producer of cold finished steel carbon bars has reaffirmed, until further notice, the present third quarter base prices, subject to a new schedule of extras and deductions, dated Sept. 20, 1939. The new schedule provides for some adjustments in the extras and deductions for quantities, reflecting changes in hot rolled bar carbon steel bar extras dated July 15, 1939. Also some adjustments in the extras for certain special processed products have been made. Cold finished bar sales have increased sub-

stantially in the past 10 days. Orders have come from practically every source and there has been some moderate sized export business. Automobile companies are placing relatively large tonnages also.

SEMI-FINISHED STEEL

. . . Sales increases up to 200%
. . . Britain wants 200,000 tons

SEMI-FINISHED steel specifications placed in the past week were, in some cases, 200 per cent in excess of the volume booked the previous week. Orders so far this month are almost that far ahead of the same period a month ago. Were it not due to allocation of steel to customers, total demand would be even greater than that reflected in actual bookings. There is danger that some steel producers will soon be out of the semi-finished steel market owing to the heavy demand for their own finishing mills.

So far no important tonnages of semi-finished steel have been booked by foreign nations, although the inquiries are piling up and are beginning to represent a substantial potential tonnage which may break loose when domestic mills decide just how much of such tonnage can be taken without seriously effecting domestic requirements.

Negotiations are being carried on between American mills and the British Iron and Steel Federation for the purchase of about 200,000 tons of semi-finished, but buyers and sellers have not been able to get together on price. The material is wanted by Britain in order to maintain export trade rather than for war purposes. For some time past Britain has been getting about 200,000 tons of semi-finished a year from Germany. Not only is this supply cut off, but supplies from Belgium and Luxemburg are also smaller. Some American mills, in an apparent effort to discourage purchases of semi-finished steel for export, have advanced the export price to $45 a ton, f. a. s.

The tremendous increase in the business of non-integrated mills will force them into the market for semi-finished steel supplies far in excess of what they had anticipated a month ago. As a result of this situation deliveries are bound to be delayed and it is believed that within a few weeks semi-finished steel makers will be booked through to the end of the year. Current quotations will rule on shipments up to and including Dec. 31 with all material shipped after that date taking the price in effect at time of shipment.

TUBULAR GOODS

. . . Sales have gained, particularly for export by oil companies

TUBULAR goods sales at PITTSBURGH have spurted in the past 10 days. No small portion of this increase in tonnage has come from major oil companies for export to countries which previously had relied on nations now at war for their supplies. This type of export business is for rather prompt shipment and will probably continue to flow to United States producers until the end of the war. Meanwhile pipe prices remain on a spot basis subject to prompt shipment at mills' convenience. Pipe prices are not announced quarterly. There has been a slight bulge in orders from domestic oil companies but the rise has not been in proportion to the increased export demand. Standard pipe sales are higher and there has been a good volume of lateral line pipe orders recently.

While sellers at CLEVELAND and YOUNGSTOWN at the start of this week reported that no price changes are contemplated at the minute, it was emphasized that tubular goods quotations have not been on the quarterly price basis for some time. Producers are booked well into November on certain mills, with electric weld and merchant items in particularly good demand. Large export orders for casing and line pipe are understood to have been distributed recently to American producers, prices on this type of business rising swiftly. Heavy coverage in casing is being sought by oil companies, utilities and other users for their domestic needs. Jobbers have been buying to a lesser degree.

PLATES

. . . Railroad equipment programs expected to increase demand.

WHILE the demand for plates has increased in all markets, the volume has not assumed anywhere near the proportions in which orders for some other products have been received. Plate mills, however, expect that the plans of the railroads for the repair of cars and locomotives and the purchase of new equipment will add greatly to their tonnage over the next few months.

Plate demand is heavy in the CHICAGO district. With the resumption of large scale railroad buying, this industry is once more becoming a major factor in the CHICAGO plate market. Western railroads are actively figuring on as many as 5000 cars at the present time and a number of other roads are known to be contemplating car programs. In addition car repairs are accounting for a considerable tonnage of plates.

Plate backlogs held by CLEVELAND and YOUNGSTOWN mills are quite heavy. On top of the suddenly activated domestic demand export buyers have come in for large tonnages at premium prices.

Sellers in NEW YORK are attempting

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Sept. 19, 1939	Sept. 12, 1939	Aug. 22, 1939	Sept. 20, 1938	1939	1938
Fabricated structural steel awards	23,100	19,100	16,450	66,590	717,025	602,625
Fabricated plate awards	430	3,145	1,390	1,555	116,045	98,045
Steel sheet piling awards	0	18,600	1,065	1,150	67,080	33,385
Reinforcing bar awards	13,700	4,300	6,610	17,910	343,270	244,575
Total Letting of Construction Steel..	37,230	45,145	25,515	87,205	1,243,420	978,630

to limit buyers to their normal requirements. Some of the Eastern mills are trying to avoid loading up their order books too far ahead, particularly for late November and December delivery, so as to be in a position to revise prices in line with actual costs before the end of the quarter. Price protection is being given on identified projects, however. Some quotations, on the other hand, are good only for five days.

Plate users in the PHILADELPHIA area were extremely active last week, endeavoring to obtain coverage over the quarter and substantial tonnages were booked by sellers. Independent producers in Eastern Pennsylvania, however, consider present plate prices highly unsatisfactory in view of increases in raw material costs and have been very cautious in accepting commitments. Despite this attitude, they have booked sufficient material to require near capacity operations of rolling equipment over the next month. A few moderate tonnages for shipment to Scandinavia and South America were placed in the past week, but as yet no large tonnages have appeared as firm inquiries. Prices asked for export plates are 2.15c., f.a.s., for miscellaneous grades and 2.25c., f.a.s., for ship plates. Inspection costs are included in latter price.

MERCHANT BARS

. . . Sales have increased tremendously, all consumers buying

HOT rolled bar sales at PITTSBURGH have increased tremendously in the past week. Orders booked so far this month are two and three times the aggregate placed a month ago at this time. Demand has come from every source with releases from automobile companies leading the parade. Although war news and fear of higher prices have been factors in driving in this business, it is to be remembered that extra changes for contract customers go into actual effect Oct. 1. It is expected that within a few weeks bar producers will have all the tonnage they can get out by the end of the year. With a good possibility of higher prices for first quarter delivery, the pressure to get shipment from now on will be heavy. Tonnages not shipped by Dec. 31 will take the price in effect at time of shipment.

Heavy demand for all types of bars, including hot rolled carbon grades, alloy and cold finished, has boosted bar mill operations in the CLEVELAND and YOUNGSTOWN districts sharply recently. All types of domestic consumers have been in the market and at the same time export business has boomed with a constantly firmer price situation.

All bar consumers in the CHICAGO district are actively buying and in some cases the sale of carbon and alloy bars at the old extras may be restricted, since deliveries already are extending well into October. It is believed that mills will take the position that no business to which the old extras apply will be taken if delivery is not possible by Oct. 31.

SHIPBUILDING

. . . 10 additional ships awarded to Pacific coast companies

THE Maritime Commission has awarded a $10,635,000 contract to the Western Pipe & Steel Co., San Francisco, for five C-1 type steel cargo ships and a contract for an identical amount for the same number of C-1 ships to the Seattle-Tacoma Shipbuilding Corp., Seattle, Wash. The 10 ships will require a total of about 26,500 tons of steel and will be diesel propelled.

The orders are the first Maritime Commission contracts to be awarded these companies but not the first to be given shipbuilders on the West Coast. The Moore Dry Dock Co., Oakland, Cal., was the first West Coast company concern to receive a shipbuilding contract from the commission.

The latest award brings the total of C-1 steel cargo ships contracted for since July to 39.

STRUCTURAL STEEL

. . . Specifications are in heavier volume . . . Fabricators order for stock

STRUCTURAL specifications at PITTSBURGH were in much greater volume in the past week than in the previous week. Orders so far this month are somewhat ahead of a month ago due primarily to the flurry in all steel business which started 10 days ago. While present prices will cover all shipments through to the end of the year, some sources look for higher quotations for the first quarter of 1940.

CLEVELAND sellers report fabricators are beginning to order stock sizes once more, since delivery can thus be expedited. In slack times mills usually note increased requests for cut lengths. Some structural mills' backlogs are three to four weeks.

WIRE PRODUCTS

. . . Prices reaffirmed on 30-day basis . . . Orders heavy

AMERICAN STEEL & WIRE CO., announced on Sept. 15 reaffirmation of present base prices on hot rolled rods, manufacturers wire, cold rolled strip and commodity strip for shipment up to and including Dec. 31, 1939, for delivery and consumption in the United States. Prices are to apply only on such shipments made up to and including Dec. 31, and any shipments after that date will be invoiced at prices in effect at time of shipment. It has been the company's policy for several months not to announce merchant wire prices on a quarterly basis.

Wire sales at PITTSBURGH have shot upward in the past week. Increased volume has been registered in rods, manufacturers' wire and merchant wire products. On rods and wire, prices have been extended to cover fourth quarter shipments but material not shipped by the end of the year will take the price in effect at time of shipment. Merchant wire sales have been made on a day to day basis with shipment required within 30 days of date of order. Demand for rods and wire has come from a widely diversified list of consumers, with auto and part makers leading the way. In some cases bookings so far this month are as much as three times greater than the volume booked in the same period last month. Scattered inquiries from South America and other countries have been noted in the past week and some business has been placed. Considerable increase in export demand and orders is expected.

Orders are also being received in CHICAGO sales offices in great volume. The reaffirmation of prices for the fourth quarter last week has steadied the situation considerably, making the delivery problem the chief factor in advance buying. In order to discourage speculative buying, all business is being taken on the basis of shipment at mills' convenience. Demand is heavy from all consuming industries and extends throughout the full line of wire products.

The unusually intense demand for all types of wire and wire products has created delivery problems at CLEVELAND, despite a sharp increase in operating schedules of producers whose obligations prior to Sept. 5 were well cleaned up. Export orders have been heavy at attractive prices. On the domestic side bolt and nut manufacturers have been particularly active, due to heavy demand upon them from automotive manufacturers and jobbers.

TIN PLATE

. . . Operations jump 11 points to 79% and may go higher

TIN plate sales picked up phenomenally in the past 10 days. Can makers, who had let stocks reach a relatively low point on the assumption that lower prices might materialize, were, at the outset of war, frantically placing additional business. As the result, most tin plate makers are booked through to the end of the year. As announced a week ago, tin plate prices are good only on shipments to be made in the fourth quarter and are on a modified spot basis. Meanwhile, export orders have jumped substantially owing to many countries having their European source of supply cut off. It is also expected that war orders from England and France will materialize because of the importance of canned food in the present situation. Meanwhile, tin plate operations are this week estimated at 79 per cent, up 11 points from a week ago. No downtrend is looked for over the remainder of the year but further increases are probable.

REINFORCING BARS

. . . Prices are strong . . . Specifications are up sharply

REINFORCING bars accepted at PITTSBURGH so far this month are running from 35 to 50 per cent ahead of the same period a month ago. Prices are strong and current quotations have been extended for fourth quarter shipments only, all business not being shipped by the end of the year to take the price in effect at the time of shipment.

BOLTS, NUTS AND RIVETS

. . . September bookings are the heaviest in two years

SEPTEMBER bookings of bolt and nut producers to date at CLEVELAND have been in excess of any previous month in the past two years. Some companies describe the situation as "beyond comparison in the recent history of our industry." All buyers have been ordering heavily with the automotive industry particularly active. New higher prices are out on stove bolts and cap screws.

Construction Up Sharply in August

CONSTRUCTION activity in both the heavy engineering and residential structure fields recorded marked gains in August. The volume of heavy engineering contracts placed in August amounted to $311,222,000, the highest August since 1929 and, on a weekly basis, 37 per cent above July and seven per cent above August. A year ago, according to a compilation by *Engineering News-Record*.

An increased volume of commercial and factory buildings pushed the volume of private projects in August up 77 per cent to $107,859,000, 77 per cent above July and 88 per cent higher than August, 1938. Public construction in August, totaling $203,363,000, was 23 per cent above preceding month, but 13 per cent below a year ago. Total of all heavy construction awards for the first eight months of 1938 is $2,049,915,000, an increase of 16.3 per cent over corresponding period of 1938.

Residential contracts awarded in August amounted to $127,163,000, the F. W. Dodge Corp. reports, which was the highest monthly total since October, 1929, with the one exception of May of this year. The cumulative total of residential contracts placed so far this year is the highest of any comparable period since 1929.

In terms of dwelling units, there have been 65 per cent more dwelling units constructed thus far in 1939 than in the corresponding period of 1938. Small residential units, which includes one- and two-family houses, accounted for 65 per cent of all dwelling units built so far this year.

U. S. Steel to Distribute Stainless Cooking Utensils

PITTSBURGH—United States Steel Corp., through its subsidiary, Union Supply Co., a chain store organization, will soon put on the market a complete line of stainless steel cooking utensils. The trade mark for these utensils will be "USCO." The kitchen utensils will through the Union Supply Co. be sold from at least 80 points of distribution throughout the country. The cooking utensils will be fabricated by a large producer of stainless steel products located in northern Ohio.

Lawrence U. S. Steel Vice-President

PITTSBURGH—B. H. Lawrence, formerly chief engineer, U. S. Steel Corp. of Delaware, last week was made vice-president, engineering, U. S. Steel Corp. of Delaware.

Mr. Lawrence has spent the greater part of his steel experience in various engineering positions within the corporation and its subsidiaries. Having been employed by the American Steel & Wire Co. at Waukegan, Ill., Worcester, Mass., and Cleveland, Ohio. He later held executive engineering positions with the U. S. Steel Corp. of New Jersey, being located at New York. On Jan. 1, 1938, he came to Pittsburgh as chief engineer of the Delaware corporation.

Copperweld Steel to Erect $2,000,000 Plant

PITTSBURGH—Copperweld Steel Co., Glassport, Pa., is to erect a $2,000,000 steel plant utilizing electric furnaces. The plant capacity will be 100,000 tons of alloy steel per year and is expected to be in operation in the first quarter of 1940.

The company will produce its own steel used in the manufacture of copperweld wire, the steel heretofore having been purchased. In addition to the new steel plant, Copperweld company has acquired five rolling mills, a 29-in., a 24-in., an 18-in., a 12-in. and a 10-in.

According to the latest information, the company has not yet finally decided on the location of the new plant.

British Fleet Intercepts German Ore Supplies

THE British contraband control fleet intercepted 29,750 tons of iron ore, 4600 tons of manganese ore and 28,500 tons of petroleum intended for Germany in the week of Sept. 9, according to a report from London published in the New York *Times*.

Eight Months Gear Sales Show 21 Per Cent Gain

INDUSTRIAL gear sales in the United States in the first eight months of the present year showed a gain of 21½ per cent over the comparable period of 1938, the American Gear Manufacturers Association reports. Sales in August were 7 per cent above July and 26 per cent ahead of August, 1938.

IRON AND STEEL SCRAP

SEPT 19—With ingot operations increasing to the highest rate in two years, scrap supplies have not been able to keep up with the demand, and prices have soared. Scarcity is not entirely due to an actual physical shortage, although a shortage exists, but to the reluctance of dealers and manufacturers to part with their scrap in such a rapidly rising market. On the Atlantic seaboard the export demand has become a negligible factor in the last two weeks owing to the vessel scarcity and the fact that domestic price levels have practically closed certain markets like Philadelphia to buying against earlier orders taken at comparatively low figures. Shipments from the Gulf to Japan are strengthening the St. Louis market, however.

At the time of going to press, No. 1 steel at Pittsburgh was being quoted at a top of $22, up $3.50 from last week. No. 1 was up $2.25 on the average at Chicago and $1.75 at Philadelphia, advancing the composite $2.50, from $16.75 to $19.25, one of the largest weekly gains on record. Since Sept. 5, the composite price has advanced $3.63 and has gained over $5 from the low point of the year, $14.08 on May 23. The average price now compares with prices prevailing in September, 1937, when the decline from the bull market of that year was under way. No large mill sales have been reported probably because dealers are willing to sell only what material is in sight. In some markets prices are largely nominal.

Chicago

This market probably never has been so confused as is the case today. Prices are nominal and change almost hourly. The leading buyer here at this writing was offering $17, but since brokers almost without exception are having to pay $17 for steel, no sale has been made at that figure. Material is not scarce, but holders of scrap, lured on by the promise of yet higher prices, refuse to sell. All mills in this district are operating at very high rates, and are expected to be in the market momentarily. Heavy melting steel this week is quoted at a flat $17, and the entire list is being advanced proportionately.

Pittsburgh

The scrap market continues its upward gyrations with current sales into consumption being made as they have been in the past 10 days—under as much cover as possible. No. 1 heavy melting steel at press time was quotable at $21.50 to $22 a ton, up $3.50 a ton from last week. Last week's quotation was obviously nominal after the press deadline. Consumer sales have been made within the past six days within a range of $19 to $22 a ton. Brokers have been closely behind these figures in making coverages. Other scrap grades have moved up accordingly and there is a shortage of and a heavy demand for blast furnace grades. Many consumers continue to take scrap on an open order basis and, with considerable secrecy surrounding purchases, it is more than likely that many sales of the same scrap material have been made at different figures. Local brokers and dealers have been unable to bring much scrap in from the outside. Dealers with yard material have indicated no willingness at this time to dispose of their supplies and it is problematical whether or not such tonnages would fill aggregate consumer demand.

Cleveland

Sharp advances are recorded this week in all grades here, with No. 1 quoted nominally at $18.50 to $19 per ton, and blast furnace material at $12 to $12.50 on sales. On the whole there has been very little new business transacted due to the agitated state of the market, and all interested parties are holding back for conditions to become more settled at the higher price levels.

Youngstown

Published quotations are up nominally this week, No. 1 heavy melting being quoted $19.50 to $20, highest since 1937. Shipments against old orders continue slow due to the difficulty in picking up material with the market so upset.

Philadelphia

It appears that a temporary crest in the upward movement of prices here has been reached, but the market is still in a very chaotic condition and prices are largely a matter of how badly a mill needs supplies. Current quotations should be considered nominal. They are based primarily upon what brokers have been forced to pay and what domestic mills have paid for various lots. The higher prices have acted to draw out increased supplies and last week's shipments to mills were in better volume than heretofore, but were still considered inadequate to take care of recent advances in melting operations.

Buffalo

The market continues to gain strength this week in spite of the fact that no actual sales of Nos. 1 or 2 heavy melting steels are reported. There is a great deal of uncertainty and dealers are holding on to stocks. Cast scrap has seen heavy activity and prices of these commodities are also on the advance. Market attention is centered on the foreign war and the possibility of an early peace settlement playing havoc with values.

Cincinnati

The district old materials market is following the trend of other markets and is definitely stronger. Dealers are bidding the entire list up and current quotations are from a dollar to almost two dollars higher than they were a week ago, and prices are still declared to be nominal. Foundries and small consumers are very active in the current market, but mills are not buying aggressively because no heavy offerings have been made by dealers.

St. Louis

Scrap iron prices at St. Louis advanced sharply from 50c. to $3 a ton, the market being the highest since 1937. The advances are due to higher prices prevailing in other markets and to sales for export, which are drawing scrap from St. Louis. Exports are bound for Japan through the Gulf ports. It is a dealer's market.

Detroit

Sale of bundles by one of the automobile body builders at mid-month brought a price at least $1 above previous quotations in THE IRON AGE but since completion of the sale, further increase in bundle price has been indicated with results at press time being a boost to $16 to $16.50. Scrap yards are still holding on to all the scrap available. Despite lack of selling activity prices as a whole in the last week have moved upward on the average of $1 a ton. Foundry prices have been boosted partly because of the demand from production foundries. The Illinois Central has sold a portion of its current accumulation of heavy melting steel for around $17 net, or $19.88 a ton delivered Chicago.

Birmingham

The market has improved and prices are stronger. However, the Birmingham market is not yet as active as those in other principal districts.

Boston

Shippers unable to secure vessel space to load at Boston, Providence and Portland, Me., the export market has come to a dead end and is purely nominal. However, a boat with 7000 tons for Italy left here Sept. 12. In the meanwhile the domestic market is zooming with prices averaging $1 a ton higher than a week ago. For Massachusetts consumption mixed borings and turnings are $5 a ton on cars, for Pittsburgh $4.25, while for eastern Pennsylvania no price has been settled. Bundled skeleton is $9.75 a ton on cars, up $1; breakable cast $12 to $12.50, up $1.75; shafting $17 to $17.25 up 50c. to 75c. Steel turnings for eastern Pennsylvania are $6.50 to $6.65, up $1.15 and for Pittsburgh $5.88 to $6.25, up about as much.

New York

Boats were again loading scrap for export this week, and once more brokers have been obliged to raise their buying prices to attract out material, this time 50c., after a $1 raise the week before. As high as $14.50 is being paid for No. 1 steel delivered to barges against $13 f.a.s. orders, obviously being covered at a loss. Buying prices for domestic shipment on cars have also advanced sharply in line with the Philadelphia market and for the first time in several years are equal to export barge prices.

Toronto

An embargo has been placed on the export of scrap from Canada. Thus any hopes that Canadian dealers may have had regarding disposal of their supplies to buyers across the line at much higher prices has been shattered. Dealers have not determined just what the embargo will mean to Canadian prices. During the week there was a minor scurry on the part of a few dealers to obtain supplies and some dealers paid up to $13 per net ton for cast scrap. However, this price was for a day or two only and quotations again dropped back to the old level of $12 to $12.50.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$21.50 to $22.00
Railroad hvy. mltng...	23.00 to 23.50
No. 2 hvy. mltng. steel.	19.00 to 19.50
Scrap rails	23.00 to 23.50
Rails 3 ft. and under..	25.00 to 25.50
Comp. sheet steel	21.50 to 22.00
Hand bundled sheets..	20.50 to 21.00
Hvy. steel axle turn..	19.00 to 19.50
Machine shop turn....	12.00 to 12.50
Short shov. turn.....	14.50 to 15.00
Mixed bor. & turn....	11.50 to 12.00
Cast iron borings.....	11.50 to 12.00
Cast iron carwheels...	18.50 to 19.00
Hvy. breakable cast...	15.50 to 16.00
No. 1 cupola cast.....	22.00 to 22.50
RR. knuckles & cplrs.	24.50 to 25.00
Rail coil springs	24.50 to 25.00
Rail leaf springs	24.50 to 25.00
Rolled steel wheels....	24.50 to 25.00
Low phos. billet crops.	27.00 to 27.50
Low phos. punchings..	24.50 to 25.00
Low phos. plate (heavy)	22.50 to 23.00
Railroad malleable	22.00 to 22.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$19.00
No. 2 hvy. mltng. steel.	17.50
Hydraulic bund., new..	19.00
Hydraulic bund., old..	$16.00 to 16.50
Steel rails for rolling.	19.00 to 19.50
Cast iron carwheels...	19.00 to 20.00
Hvy. breakable cast...	18.50 to 19.00
No. 1 cast	19.50 to 20.00
Stove plate (steel wks.)	15.50 to 16.00
Railroad malleable ...	19.50 to 20.00
Machine shop turn....	12.00 to 12.50
No. 1 blast furnace....	10.50 to 11.00
Cast borings	11.50 to 12.00
Heavy axle trnings....	14.00 to 14.50
No. 1 low phos. hvy...	22.00
Couplers & knuckles...	22.00
Rolled steel wheels	22.00
Steel axles	22.50 to 23.00
Shafting	23.50 to 24.00
Spec. iron & steel pipe	15.00 to 15.50
No. 1 forge fire	15.50 to 16.00
Cast boring (chem.)...	11.50 to 12.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$17.00
Auto. hvy. mltng. steel alloy free	$15.50 to 16.00
No. 2 auto steel	14.00 to 14.50
Shoveling steel	17.00
Factory bundles	15.75 to 16.25
Dealers' bundles	14.75 to 15.25
Drop forge flashings...	13.00 to 13.50
No. 1 busheling	15.50 to 16.00
No. 2 busheling, old...	8.75 to 9.25
Rolled carwheels	17.50 to 18.00
Railroad tires, cut	18.00 to 18.50
Railroad leaf springs..	17.50 to 18.00
Steel coup. & knuckles	17.50 to 18.00
Axle turnings	15.50 to 16.00
Coil springs	19.50 to 20.00
Axle turn. (elec.)	16.50 to 17.00
Low phos. punchings..	18.50 to 19.00
Low phos. plates 12 in. and under	18.00 to 18.50
Cast iron borings	9.50 to 10.00
Short shove. turn.....	9.50 to 10.00
Machine shop turn....	9.50 to 10.00
Rerolling rails	21.00 to 21.50
Steel rails under 3 ft..	19.00 to 19.50
Steel rails under 2 ft..	19.50 to 20.00
Angle bars, steel	18.50 to 19.00
Cast iron carwheels ..	15.50 to 16.00
Railroad malleable	18.00 to 18.50
Agric. malleable	15.00 to 15.50

	Per Net Ton
Iron car axles	$21.00 to $21.50
Steel car axles	20.50 to 21.00
Locomotive tires	16.00 to 16.50
Pipes and flues	11.50 to 12.00
No. 1 machinery cast..	15.00 to 15.50
Clean auto. cast	15.50 to 16.00
No. 1 railroad cast....	14.00 to 14.50
No. 1 agric. cast	13.00 to 13.50
Stove plate	10.75 to 11.25
Grate bars	10.75 to 11.25
Brake shoes	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$19.50 to $20.00
No. 2 hvy. mltng. steel.	18.50 to 19.00
Low phos. plate	20.75 to 21.25
No. 1 busheling	18.50 to 19.00
Hydraulic bundles	19.00 to 19.50
Machine shop turn....	10.25 to 10.75

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$18.50 to $19.00
No. 2 hvy. mltng. steel.	17.50 to 18.00
Comp. sheet steel	18.25 to 18.75
Light bund. stampings	15.00 to 15.50
Drop forge flashings...	17.50 to 18.00
Machine shop turn....	9.50 to 10.00
Short shov. turn.	10.50 to 11.00
No. 1 busheling	17.50 to 18.00
Steel axle turnings....	14.50 to 15.00
Low phos. billet and bloom crops	21.50 to 22.00
Cast iron borings	12.00 to 12.50
Mixed bor. & turn.....	12.00 to 12.50
No. 2 busheling	12.00 to 12.50
No. 1 cupola cast.....	19.75 to 20.25
Railroad grate bars...	14.50 to 15.00
Stove plate	14.50 to 15.00
Rails under 3 ft.	21.75 to 22.25
Rails for rolling	21.25 to 21.75
Railroad malleable	19.25 to 19.75

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.00 to $18.00
No. 2 hvy. mltng. steel.	15.00 to 16.00
Scrap rails	18.00 to 18.50
New hvy. b'ndled sheets	15.00 to 16.00
Old hydraul. bundles..	12.00 to 12.50
Drop forge flashings...	15.00 to 16.00
No. 1 busheling	15.00 to 16.00
Machine shop turn....	9.00 to 9.50
Shov. turnings	10.00 to 10.50
Mixed bor. & turn....	8.50 to 9.00
Cast iron borings.....	8.50 to 9.00
Knuckles & couplers..	19.50 to 20.00
Coil & leaf springs.....	19.50 to 20.00
Rolled steel wheels....	19.50 to 20.00
No. 1 machinery cast..	18.00 to 18.50
No. 1 cupola cast.....	17.00 to 17.50
Stove plate	14.00 to 14.50
Steel rails under 3 ft...	19.50 to 20.00
Cast iron carwheels...	17.00 to 18.00
Railroad malleable ...	18.00 to 19.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting..	$15.50 to $16.00
No. 1 hvy. melting....	15.50 to 16.00
No. 2 hvy. melting....	14.50 to 15.00
No. 1 locomotive tires.	16.00 to 16.50
Misc. stand. sec. rails.	15.00 to 15.50
Railroad springs	18.00 to 18.50
Bundled sheets	8.50 to 9.00
No. 1 busheling	8.00 to 8.50
Cast. bor. & turn.....	3.50 to 4.00
Machine shop turn....	4.50 to 5.00
Heavy turnings	9.50 to 10.00
Rails for rolling	17.50 to 18.00
Steel car axles	20.00 to 20.50
No. 1 RR. wrought.....	10.00 to 10.50
No. 2 RR. wrought....	15.00 to 15.50
Steel rails under 3 ft..	17.50 to 18.00
Steel angle bars	16.00 to 16.50
Cast iron carwheels...	15.00 to 15.50
No. 1 machinery cast..	15.00 to 15.50
Railroad malleable	16.00 to 16.50
No. 1 railroad cast....	12.50 to 13.00
Stove plate	10.00 to 10.50
Grate bars	8.50 to 9.00
Brake shoes	11.00 to 11.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$13.50 to $14.00
No. 2 hvy. mltng. steel.	11.50 to 12.00
Scrap rails for mltng.	18.00 to 18.50
Loose sheet clippings.	9.00 to 9.50
Hydrau. b'ndled sheets	13.00 to 13.50
Cast iron borings	5.00 to 5.50
Machine shop turn....	6.50 to 7.00
No. 1 busheling	9.50 to 10.00
No. 2 busheling	4.00 to 4.50
Rails for rolling	19.50 to 20.00
No. 1 locomotive tires.	15.50 to 16.00
Short rails	20.50 to 21.00
Cast iron carwheels...	14.75 to 15.25
No. 1 machinery cast..	15.50 to 16.00
No. 1 railroad cast....	14.50 to 15.00
Burnt cast	8.75 to 9.25
Stove plate	8.75 to 9.25
Agricul. malleable	13.00 to 13.50
Railroad malleable	15.50 to 16.00
Mixed hvy. cast.	13.25 to 13.75

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.....	$13.00
Scrap steel rails	15.00
Short shov. turnings...	8.50
Stove plate	9.50
Steel axles	18.50
Iron axles	18.50
No. 1 RR. wrought....	12.50
Rails for rolling	18.00
No. 1 cast	16.00
Tramcar wheels	16.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$12.50 to $13.00
No. 2 hvy. mltng. steel.	11.50 to 12.00
Borings and turnings..	7.50 to 8.00
Long turnings	6.75 to 7.25
Short shov. turnings..	8.00 to 8.50
No. 1 machinery cast..	13.50 to 14.00
Automotive cast.	15.00 to 15.50
Hvy. breakable cast...	11.00 to 11.50
Stove plate	9.00 to 9.50
Hydraul. comp. sheets	16.00 to 16.50
New factory bushel...	13.00 to 13.50
Sheet clippings	10.50 to 11.50
Flashings	12.50 to 13.00
Low phos. plate scrap.	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Hvy. breakable cast...	14.00 to 14.50
No. 1 machinery cast..	14.50 to 15.00
No. 2 cast	12.00 to 12.50
Stove plate	11.00 to 11.50
Steel car axles	16.00 to 17.00
Shafting	16.00 to 17.00
No. 1 RR. wrought....	11.00 to 11.50
No. 1 wrought long....	9.50 to 10.00
Spec. iron & steel pipe	11.50 to 12.00
Rails for rolling	16.00 to 16.50
Clean steel turnings*.	7.50 to 8.00
Cast borings*	6.50 to 7.00
No. 1 blast furnace....	6.50 to 7.00
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	8.00 to 8.50
Light iron	5.00 to 5.50

Per gross ton, delivered local foundries:

No. 1 machn. cast†....	$16.00 to $16.50
No. 2 cast†	12.00 to 12.50

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$12.00 to $12.50
Machine shop turn....	5.88 to 6.65
Mixed bor. & turn....	4.25 to 5.00
Bun. skeleton long..	.... 9.75
Shafting	17.00 to 17.25
Cast bor. chemical ...	6.00 to 6.50

Per gross ton delivered consumers' yards:

Textile cast .....:....	$14.00 to $15.00
No. 1 machine cast...	14.00 to 15.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel.	$13.25 to $13.75
No. 2 steel	11.75 to 12.25

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.....	$14.35
No. 2 hvy. mltng. steel.....	13.35

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$9.25	$8.75
No. 2 hvy. mltng. steel.	8.00	7.50
Mixed dealers steel....	6.75	6.25
Drop forge flashings...	8.25	7.75
New loose clippings...	4.25	3.75
Busheling	3.75	3.25
Scrap pipe	4.25	3.75
Steel turnings	4.25	3.75
Cast borings	3.75	3.25
Machinery cast	14.00	13.50
Dealers cast	12.00	11.50
Stove plate	8.00	7.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.50 to 13.00
No. 2 cast	12.00 to 12.50
Stove plate	11.00 to 11.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.....	Nominal
No. 2 hvy. mltng. steel.....	Nominal
Rails (scrap)	Nominal

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mltng. steel.....	Nominal
No. 2 hvy. mltng. steel.....	Nominal

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.15c.
Detroit, delivered	2.25c.
Duluth	2.25c.
Philadelphia, delivered	2.47c.
New York	2.49c.
On cars dock Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.00c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c.
Detroit, delivered	2.00c.
On cars dock Tex. Gulf ports	2.25c.
On cars dock Pacific ports	2.35c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.80c.
Detroit, delivered	1.90c.
On cars dock Tex. Gulf ports	2.15c.
On cars dock Pacific ports	2.25c.

IRON BARS

Chicago and Terra Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary	2.65c.
Detroit	2.70c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.00c.
Detroit, delivered	2.10c.
Philadelphia, delivered	2.17c.
Granite City	2.10c.
On cars dock Pacific ports	2.50c.
Wrought iron, Pittsburgh	4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.05c.
Detroit, delivered	3.15c.
Granite City	3.15c.
Philadelphia, delivered	3.37c.
On cars dock Pacific ports	3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from $4 to $8 a ton were prevalent. Concessions withdrawn, on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron, Pittsburgh	6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.80c.
F.o.b. cars dock Pacific ports	4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.00c.
Detroit, delivered	2.10c.

Cooperage Stock

Pittsburgh & Chicago	2.10c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from $4 to $8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.80c.
Chicago	2.90c.
Detroit, delivered	2.90c.
Worcester	3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	2.95c.
Detroit, delivered	3.05c.
Worcester	3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to $4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.40
Coated nails	2.40
Cut nails, carloads	3.70

	Base per 100 Lb.
Annealed fence wire	$2.90
Galvanized fence wire	3.30
Polished staples	3.20
Galvanized staples	3.35
Twisted barbless wire	3.25
Woven wire fence, base column.	67
Single loop bale ties, base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool...	$2.58
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool....	$2.76

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	56	36	¼ & ⅜	..+9	+30
¼ to ⅜	.59	43½	½	24	6½
½	.....63½	54	¾	30	13
¾	.....66½	60½	1 & 1¼	.34	19
1 to 3	...68½	60½	1½	38	21½
			2	.....37½	21

Lap Weld

2	61	52½	2	.....30½	15
2½ & 3	..64	55½	2½ to 3½	31½	17½
3½ to 6.66		57½	4	.....33½	21
7 & 8.65		55½	4½ to 8.32	½	20
9 & 10.64	½	55	9 to 12	..28½	15
11 & 12.63	½	54			

Butt weld, extra strong, plain ends

⅛	.....54½	41½	¼ & ⅜	.+10	+43
¼ to ⅜	.56½	45½	½	25	9
½	.....61½	37½	¾	31	15
¾	.....65½	57½	1 to 2	...38	22½
1 to 3	...67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	.....33½	18½
2½ & 3	..63	55½	2½ to 4.39	½	25½
3½ to 6.66	½	59	4½ to 6.37	½	24
7 & 8.65	½	56	7 & 8	..38½	24½
9 & 10.64	½	55	9 to 12	..32	20½
11 & 12.63	½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d.....13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d...13 B.W.G.	10.67	9.26	....
1½ in. o.d...13 B.W.G.	11.70	10.23	$9.72
1⅝ in. o.d...13 B.W.G.	13.42	11.64	11.06
1 in. o.d.....13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d...13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d...12 B.W.G.	18.45	16.01	15.16
2½ in. o.d...12 B.W.G.	20.21	17.54	16.58
2⅝ in. o.d...12 B.W.G.	21.42	18.59	17.54
3 in. o.d.....12 B.W.G.	22.48	19.50	18.35
3½ in. o.d...11 B.W.G.	28.37	24.62	23.15
4 in. o.d.....10 B.W.G.	35.20	30.54	28.66
4½ in. o.d...10 B.W.G.	43.04	37.35	35.22
5 in. o.d..... 9 B.W.G.	54.01	46.87	44.25
6 in. o.d..... 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham..	43.00
6-in. and larger, f.o.b. deck, San Francisco or Los Angeles....	52.00
F.o.b. dock, Seattle.....	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle.....	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $5 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. and 6 in. and smaller....	68½
Larger and longer up to 1 in..	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive.....	64
1⅛ in. and larger	62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

	U.S.S.	S.A.E.
Semi-fin. hexagon nuts		
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. and larger.....	62	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, with nuts loose	72½
Stove bolts in packages, with nuts attached, add 15% extra.	
Stove bolts in bulk	83½

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham ...65 and 10

Cap and Set Screws

(Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller....50 and	10
Milled headless set screws, cut thread ¾ in. and smaller.....	70
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	73
Milled studs	52

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base.....	2.70c.
Delivered, Detroit	2.80c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2100 (1¼% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chro.-Ni.-Mo.	1.85
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
6100 Chromium spring steel....	0.15
6100 Chromium-vanadium bar...	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes..	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip ...	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot stp.	17c.	17.50c.	24c.	35c.
Cold stp.	22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 9d.
Steel bars, open hearth..	£10 8s.
Beams, open hearth....	£10
Channels, open hearth..	£10 5s.
Angles, open-hearth	£10
Black sheets, No. 24 gage.	£13
Galvanized sheets, No. 24 gage	£15 15s.

CONTINENTAL

Per Gross Ton, Gold £. f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G...	£5 10s.
Steel bars, merchant	£5 5s.
Sheet Bars	Nominal
Plate ¼ in. and up.....	£5 7s.
Plate 3/16 in. and 5 mm...	£5 13s.
Sheet ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base....	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati	23.06
Northern, delivered, Cincinnati	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo....$28.50

Gray Forge

Valley or Pittsburgh furnace..$22.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.34

Canadian Pig Iron

	Per Gross Ton
Montreal	
Foundry iron	$24.50 base
Malleable	25.00 base
Basic	24.50 base
Toronto	
Foundry iron	$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

	Per Gross Ton
Domestic, 80% (carload)	$100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$32.00
Domestic, 26 to 28%	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

	Per Gross Ton
10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

	Per Gross Ton
F.o.b. Jackson, Ohio, 5.00 to 5.50%	$26.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$98.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.75
Ferrotungsten, 100 lbs. and less	2.00
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore*.

C.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12c.
Iron, basic or foundry, Swedish, aver. 65% iron	11c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	38c.
Man., African, Indian, 44-48%	35c.
Man., African, Indian, 49-51%	39c.
Man., Brazilian, 46 to 48%	34c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$22.00 to $24.00
Tungsten, domestic, scheelite delivered	23.00 to 25.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$17.00
Rhodesian, 45%	21.00
Rhodesian, 48%	24.00
Turkish, 48-49%	24.50
Turkish, 45-56%	22.00
Turkish, 40-11%	18.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	$26.00
48-49%	25.00

* All foreign ore prices are nominal.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00 to $20.00
Domestic, f.o.b. Ohio River landing barges	$18.00 to $20.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	$22.50 to $23.50
Domestic No. 1 ground bulk, 96 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$31.50 to $33.50

FUEL OIL

	Per Gal.
No. 2, f.o.b. Bayonne, N. J.	4.25c.
No. 6, f.o.b. Bayonne, N. J.	2.50c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd.	5.375c.
No. 4 industrial, del'd Cleve'd.	5.125c.
No. 5 industrial, del'd Cleve'd.	4.25c.
No. 6 industrial, del'd Cleve'd.	4.00c.

COKE

	Per Net Ton
Furnace, f.o.b. Connellsville, Prompt	$4.75 to $5.00
Furnace, f.o.b. Connellsville, Prompt	5.50 to 6.00
Foundry, by - product Chicago ovens	10.25
Foundry, by - product del'd New England	12.50
Foundry, by - product del'd Newark or Jersey City	10.88 to 11.40
Foundry, by - product Philadelphia	10.95
Foundry, by - product delivered Cleveland	10.30
Foundry, by - product delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by - product del'd St. Lois industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb. On reinforcing bars base applies to orders of less than one ton and includes switching and carting charge.

All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.74c.
Structural shapes	3.75c.
Soft steel bars, round	3.84c.
Iron bars, Swed. charcoal	7.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.40c.
Galv. sheets (24 ga.)	4.50c.
Long ternes (24 ga.)	5.50c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
Floor plate, ⅛ in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.70c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in lots of five kegs or more	$2.65

*For lots less than 2000 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.25c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over.)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.55c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

* For 5000 lb. or less.
† 500 lb. base quantity.
Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.52c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier*	4.57c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl., also sizes No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.82c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

PHILADELPHIA

	Base per Lb
*Plates, ¼-in. and heavier	3.40c
*Structural shapes	3.40c
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
‡Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.06c.
*Steel hoops	4.10c
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c
†Hot-rolled anneal. sheets	3.40c
†Galvanized sheets (No. 24)	4.28c
*Diam. pat. floor plates, ¼ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.

*For quantities between 400 and 1999 lb.

†For 10 bundles or over.

‡For one to five tons.

BIRMINGHAM

	Base per Lb
Bars and bar shapes	3.50c
Structural shapes and plates	3.55c
Hot rolled sheets No. 10 ga.	3.35c
Galvanized sheets No. 24 ga. or more	4.75c.
Strip	3.60c.
Reinforcing bars	3.50c.
Floor plates	5.85
Cold finished bars	4.45
Machine and carriage bolts	50 & 10 off list
Rivets (structural)	$4.60 base

On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tanks and U. M.	4.00c.	3.80c.	3.85c.
Shapes, standard	4.00c.	3.80c.	3.95c.
Soft steel bars	4.00c.	3.80c.	3.90c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.275c.	open.	2.975c
Hot-rolled sheets (No. 10)	3.75c.	4.00c.	3.70c.
Galv. sheets (No. 24 and lighter)	5.15c.	4.75c.	5.00c
Galv. sheets (No. 22 and heavier)	5.40c.	4.75c.	5.00c.
Cold-finished steel Rounds	6.55c.	6.60c.	7.10c
Squares and hexagons	7.80c.	7.85c.	7.10c
Flats	8.30c.	8.35c.	8.10c
Common wire nails—base per keg less carload	$3.00	$3.05	$3.00

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb
Mild steel bars, rounds	4.10c
Structural shapes	4.00c.
Plates	4.00c
Cold-finished bars	4.82c.
Hot-rolled annealed sheets, No. 24	4.75c
Galvanized sheets, No. 24	5.00c

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb
Soft steel bars	3.33c
Structural shapes	3.65c
Plates	3.60c
Floor plates	5.27c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.59c.
Hot-rolled strip, under No. 12	3.68c.
Hot-rolled strip, No. 12 and over	3.43c.
Cold-finished bars	3.80c.
Cold-rolled strip	3.55c
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold-rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items.

*Price applies only in metropolitan Detroit.

FABRICATED STEEL

. . . Lettings advance to 23,100 tons from 19,100 tons last week . . . New projects higher at 18,600 tons as against 14,800 tons a week ago . . . Plate awards only 420 tons.

NORTH ATLANTIC STATES
AWARDS

5000 Tons, Boston, New England Mutual Life Insurance Co. building, to Bethlehem Steel Co., Bethlehem, Pa.

2630 Tons, New York, apartment building, 240 Central Park South, to Bethlehem Steel Co., Bethlehem, Pa.

2000 Tons, Edgewater, N. J., Hill Brothers coffee plant, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

1650 Tons, Burlington, N. J., power station, to Lehigh Structural Steel Co., Allentown, Pa.

1580 Tons, New York, Tiffany store, 57th Street and Fifth Avenue, to Bethlehem Steel Co., Bethlehem, Pa.

415 Tons, Franklin Falls, N. H., Franklin Falls Dam, to American Bridge Co., Pittsburgh, and Phillips & Davies Mfg. Co., Kenton, Ohio.

400 Tons, Fort Totten, N. Y., garage, shop building and gun sheds, to Belmont Iron Works, Philadelphia.

340 Tons, Portsmouth, N. H., machine and pipe shop for Navy Yard, to Lehigh Structural Steel Co., Allentown, Pa.

300 Tons, New York, curbing East River Drive, to Eggleston Bros. & Co., Long Island City.

300 Tons, Brooklyn, National Lead Co. building, to American Bridge Co., Pittsburgh.

235 Tons, Little Falls, N. J., Regional High School, to Selbach Meyer Co., West New York, N. J.

200 Tons, Newport, R. I., torpedo station automatic plant extension, to Bethlehem Fabricators, Inc., Bethlehem, Pa.; O. D. Purington Co., Providence, R. I., contractor.

155 Tons, Catskill, N. Y., State bridge, RC-4038, to Anthracite Bridge Co., Scranton, Pa.

150 Tons, Wilkes-Barre, Pa., Pumping Stations, U. S. Government, to Fabricator.

140 Tons, New York, Veterans' Administration, addition to building No. 2 in Bronx, to Lehigh Structural Steel Co., Allentown, Pa.

140 Tons, Wilmington, Del., F. W. Woolworth store, to Bethlehem Contracting Co., Bethlehem, Pa.

145 Tons, Sayreville, N. J., buildings for National Lead Co., to Savary & Glaeser Co., Dunellen, N. J.

135 Tons, Pittsburgh, municipal hospital, to Pittsburgh Bridge & Iron Co., Pittsburgh.

105 Tons, Royersford, Pa., manufacturing building, to American Fabricated Steel Co., Philadelphia.

100 Tons, Washington County, N. Y., State highway bridge, to Phoenix Bridge Co., Phoenixville, Pa.

100 Tons, Whitneyville-Machias, Me., State bridge, to American Bridge Co., Pittsburgh.

100 Tons, Brighton, Mass., seminary, to West End Iron Works, Cambridge, Mass.

THE SOUTH

140 Tons, Alcoa, Tenn., clamp arms and bus frames, to McKee Oliver Co., Pittsburgh.

CENTRAL STATES

1180 Tons, Omaha, Neb., United Benefit Life Insurance Co. building, to Omaha Steel Works, Omaha.

650 Tons, Chicago, Chatham Housing project, to Reuter Brothers, Chicago.

600 Tons, Chicago, Ida B. Wells Housing project, to New City Iron Works Co., Chicago.

280 Tons, Chicago, Paul Schulze Biscuit Co. building, to Wendnagel & Co., Chicago.

300 Tons, Chicago, Ill., yard structures, Commonwealth Edison Co., to Bethlehem Steel Co., Bethlehem, Pa.

175 Tons, Cleveland, addition for Cleveland Graphite Bronze Co., to Mooney Iron Works, Cleveland.

160 Tons, Indianapolis, high school addition, to Hetherington & Berner, Inc., Cleveland.

140 Tons, St. Louis, Griesedieck Brothers stock house, to Stupp Brothers Bridge & Iron Co., St. Louis.

125 Tons, Howell County, Mo., bridge, to Stupp Brothers Bridge & Iron Co., St. Louis.

WESTERN STATES

1425 Tons, Pollock, Cal., O'Brien Creek bridge, to Bethlehem Steel Co., San Francisco.

750 Tons, Alameda, Cal., Naval base power house and warehouse, to Bethlehem Steel Co., San Francisco; through K. E. Parker, San Francisco, contractor.

700 Tons, Bonneville, Ore., to Grand Coulee Dam, Wash., galvanized steel transmission tower footings, to Bethlehem Steel Co.; through Fritz Ziebarth, Vancouver, Wash., contractor.

145 Tons, Calexico, Cal., power plant, All-American Canal drop No. 3, to Consolidated Steel Corp., Los Angeles; through Charles W. Pettifer, Long Beach, contractor.

PENDING STRUCTURAL PROJECTS
NORTH ATLANTIC STATES

1500 Tons, New York, apartment house, 1150 Park Avenue Corp.

1000 Tons, Chester, Pa., power house extensions, Philadelphia Electric Co.

1000 Tons, Philadelphia, Lit Brothers warehouse.

725 Tons, Salamanca, N. Y., State bridge RC-4073.

700 Tons, New York, James McSweeney warehouse.

700 Tons, Philadelphia, addition to central office building, Bell Telephone Co.

612 Tons, Montville, N. J., bridge over Passaic River on route 6; bids received by State Highway Department until Sept. 29.

325 Tons, New York, reconstruction of railings, Williamsburg bridge.

275 Tons, Oil City, Pa., Center Street bridge.

275 Tons, Duquesne, Pa., building, Linde Air Products Co.

200 Tons, Ford City, Pa., tank building, Pittsburgh Plate Glass Co.

250 Tons, Apex, N. Y., bridge, FAS-8534.

250 Tons, Queens, N. Y., two highway bridges.

200 Tons, Rome, N. Y., mill building, for Rome Cable Corp.

200 Tons, Corning, N. Y., building, Corning Glass Co.

125 Tons, Plattsburgh, N. Y., Montgomery Ward & Co. building.

100 Tons, Keene, N. H., high school, W. H. Trumbull Co., Hanover, N. H., contractor.

100 Tons, Danbury, N. H., State bridge.

THE SOUTH

1300 Tons, Shreveport, La., building, Commercial National Bank.

1200 Tons, Norfolk, Va., sub-assembly shop, Navy Department.

960 Tons, Norfolk, Va., store house, for Navy Department, E. & J. Pfatzer, low bidder.

CENTRAL STATES

500 Tons, State of Illinois, highway projects; bids Sept. 26.

220 Tons, Lead, S. D., high school building.

100 Tons, Detroit, post office; bids in.

WESTERN STATES

4000 Tons, Kelso-Chehalis-Renton, Wash., transmission line towers; bids Sept. 23.

1285 Tons, Los Angeles, First and Beverly grade separation over Glendale Boulevard; bids Oct. 4.

300 Tons, Wamsutter, Wyo., bridge, FAP-210-F.

155 Tons, Marshfield, Ore., Coal Bank Slough bridge; bids Sept. 28.

FABRICATED PLATES
AWARDS

430 Tons, Cape Girardeau, Mo., two oil barges, to American Bridge Co., Pittsburgh.

Government Asks for Bids on Manganese, Tungsten and Chromium

WASHINGTON — The Procurement Division of the Treasury Department on Tuesday asked for bids to be opened Oct. 19, on 48 per cent manganese ore. This is the first of a series of bids invited under the "Strategic and Critical Minerals" Act, involving purchase of $100,000,00 over a four-year period, of which $10,000,000 has been made available for the first year. On Wednesday bids will be asked for tungsten and chromium ore and will be opened Oct. 20.

The manganese bids do not indicate how much material actually will be purchased but ask for prices on quantities ranging from 5000 to 40,000 gross tons for delivery at Baltimore ports, either by rail or water, and from 5000 to 15,000 tons at the Army Ordnance Depot at Ogden, Utah. The division said the total amount to be purchased cannot be determined until it can be ascertained what quantities can be procured at each delivery point at the most advantageous price. Deliveries are to be made within six months.

All of the manganese is for the production of standard ferromanganese. While the manganese content is uniformly specified at 48 per cent, bids specify three grades, A, B and C, based on the iron, silica, phosphorus, aluminum and zinc content, the maximum iron and zinc content not to exceed 7½ per cent, respectively. Preferably, all ores should pass a 4-in. screen and contain a minimum of fines. No ore will be accepted which will not pass a 6-in. screen nor which contains more than 12½ per cent of fines which will pass a 20 mesh screen.

The Grade A deliveries at Baltimore range from 5000 to 35,000 tons, f. o. b. Ordnance Depot, Curtis Bay, and c. i. f. Baltimore Harbor, for Grade B, from 5000 to 40,000, respectively, and for Grade C, from 5000 to 25,000 tons, respectively.

Under the act the manganese offered must be from new importations or from domestic mines and must not be drawn from stocks now in warehouses, thus assuring a net addition to the nation's available supply. Except for rotation to prevent deterioration, the ore shall be used only upon the order of the President in time of war or when he shall find a national emergency exists with respect to national defense as a consequence of the threat of war.

. . . NON-FERROUS . . .

. . . Buying pressure is reduced, but demand is still fairly heavy . . . Prime Western sales are 20,522 tons for the week

NEW YORK, Sept. 19.—Repeated assurances by producers that supplies were in ample quantity to take care of their requirements and the imposition of unofficial restrictions to prevent "unreasonable" purchases, brought more orderly trading in the non-ferrous markets in the past week, but consumer demand was still very strong. In copper particularly, is the absence of the panic hysteria obvious. Day-to-day demand for the red metal continues in very good volume, and while all demands have not been satisfied, consumers generally credit the producers' restrictions to preventing a runaway market. Domestic prices are unchanged at 12c. per lb., delivered Connecticut Valley, while in the outside market prices showed an easier tendency toward the close of the week.

Producers are generally limiting sales to December and prior, although some small tonnages are available for delivery in the first quarter of 1940.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Sept. 13	Sept. 14	Sept. 15	Sept. 16	Sept. 18	Sept. 19
Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York	Nominal					
Zinc, East St. Louis[2]	6.25	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis[3]	5.35	5.35	5.35	5.35	5.35	5.35

[1] Delivered Conn. Valley. Deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	Nominal	Nominal
Copper, Lake	13.25c.	13.125c.
Copper, electro	13.00c.	13.00c.
Copper, castings	12.625c.	12.625c.
*Copper sheets, hot-rolled	20.12c.	20.12c.
*High brass sheets	18.90c.	18.96c.
*Seamless brass tubes	21.06c.	21.06c.
*Seamless copper tubes	20.62c.	20.62c.
*Brass rods	13.63c.	13.63c.
Zinc slabs	7.25c.	8.00c.
Zinc sheets, No. 9 casks	10.75c.	12.10c.
Lead, American pig	6.50c.	6.125c.
Lead, bar	8.95c.	8.75c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	15.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	Nominal	Nominal
Babbitt metal, commercial grade	Nominal	Nominal

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	10.125c.	10.75c.
Copper, hvy. and wire	9.125c.	9.50c.
Copper, light and bottoms	8.125c.	8.625c.
Brass, heavy	5.25c.	5.75c.
Brass, light	5.625c.	5.125c.
Hvy. machine composition	8.25c.	9.125c.
No. 1 yel. brass turnings	5.00c.	5.50c.
No. 1 red brass or compos. turnings	8.125c.	8.625c.
Lead, heavy	4.375c.	4.75c.
Cast aluminum	7.375c.	8.625c.
Sheet aluminum	13.00c.	15.50c.
Zinc	3.125c.	4.375c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 14c. a lb., New York; American, 12c. a lb., f.o.b. smelter. QUICKSILVER, $165 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.75c. a lb.

Lead

With most users completely covered for their September and October requirements, the lead market in the past week was a comparatively quiet affair, although on several days sellers were able to dispose of intake. November books will not be opened until the middle of next week and consequently little change in the market is expected until then. Domestic quotations remain very firm at 5.50c. per lb., New York.

Zinc

Prime Western sales in the past week 20,522 tons, slightly below the preceding week, and shipments increased to 8424 tons. Backlogs now stand at 82,068 tons, equal to roughly two months' production. The demand was well diversified and shipping dates were well scattered. Domestic quotations are unchanged at 6.64c. per lb., New York. Zinc ore prices rose $2 a ton last week to $42 for all grades, reflecting the recent increase in the price of the refined metal.

Tin

The market here has been on a strictly nominal basis since the closing of the London Metal Exchange and sales on the Commodity Exchange here have been the only medium available to determine the general trend of prices. Trading on the Commodity Exchange has indicated a sharp drop in prices over the week, with as low as 47c. being done on March deliveries at the end of the week. Straits prices at Singapore, Penang and London have been fixed by the British government at £230, giving a theoretical value of 43.75c. per lb., c.i.f., New York, under present freight and insurance rates. The International Tin Committee also announced an adjustment in third quarter quotas to 100 per cent, up 40 points from the rate set prior to the war. This increase should make an extra 6500 tons available each month.

TNEC Steel Hearings Delayed

WASHINGTON—Steel hearings before the Temporary National Economic Committee which had been set tentatively for about Oct. 15, probably will not be begun by the Department of Justice until a week later than that date. This delay is indicated by postponement of the oil hearings until Sept. 25. The oil hearings had tentatively been scheduled for Sept. 18.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

General Electric Co., Schenectady, N. Y., plans new eight-story factory branch, storage and distributing plant, with manufacturing department, at Eighth and Harrison Streets, San Francisco. Cost close to $600,000 with equipment. Erection will begin soon. San Francisco offices are in Russ Building.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Sept. 26 for gages (Circular 109); until Sept. 27, springs (Circular 111); until Sept. 28, milling cutters (Circular 114); until Sept. 29, drop forgings, including eyebolts, lifting eyes, extractors, etc. (Circular 116).

International Agricultural Corp., 61 Broadway, New York, through its subsidiary, Union Potash & Chemical Co., plans additional development of potash properties in New Mexico, including new equipment in present mine, sinking of an additional shaft, new milling and refining plant, storage and distribution facilities, and further underground development work. Financing is being arranged.

Smith Carbonic & Oxygen Co. 1449 York Avenue, New York, carbonic gas, industrial oxygen, etc., has leased building at 421 East Seventy-fifth Street for plant, increasing present capacity.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 26 for pressure gages (Schedule 7177), 650 acetylene and oxygen cylinders (Schedule 7163) for Brooklyn Navy Yard; fire extinguishing systems (Schedule 7036) for Brooklyn and Philadelphia yards.

American Smelting & Refining Co., 120 Broadway, New York, has let general contract to Michael Ries, Fords National Bank Building, Fords, N. J., for three one-story additions to plant at Perth Amboy, N. J., 85 x 250 ft., for general shop; 75 x 125 ft. for storage and distribution; and 65 x 90 ft. for general service. Cost over $85,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Sept. 25 for 1425 antennas and 1600 guys (Circular 77); until Sept. 26, galvanized guards, cable rack hooks, pin dowels, pulling-in manhole irons, etc. (Circular 80); until Oct. 6, 1,350,000 ft. of wire (Circular 74).

Quartermaster, West Point, N. Y., asks bids until Sept. 26 for screws, locks, hack saw blades, surface bolts, bolts, plow steel wire rope, fasteners, etc. (Circular 1052-23).

Department of Correction, State Office Building, Albany, N. Y., will soon begin superstructure for new power plant at State prison, Dannemora, N. Y. Building award was let recently to D. E. O'Brien Construction Co., Whitehall, N. Y. Cost about $300,000 with equipment.

Construction Quartermaster, Fort H. G. Wright, N. Y., asks bids until Oct. 3 for new ordnance building, machine shop and garage, warehouse, utilities building and boiler plant.

Board of Education, Camden, N. J., plans new power house at Third and Linden Streets for Grant and Cooper schools. Cost about $45,000 with equipment. Financing has been arranged through Federal aid.

Andrew Jergens Co., 2535 Spring Grove Avenue, Cincinnati, soaps, chemical specialties, etc., has let general contract to James Stewart & Co., 230 Park Avenue, New York, for new one and multi-story plant at Belleville, N. J., on property formerly occupied by Belleville Copper Rolling Mills. Plant will total about 300,000 sq. ft. of floor space. Cost about $1,000,000 with equipment. Tietig & Lee, 34 West Sixth Street, Cincinnati, are architects.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Sept. 25 for four gaging machines (Circular 333); until Oct. 6 for reworking about 10,000 lb. of aluminum turnings (Circular 325).

Williamsport Wire Rope Division, Bethlehem Steel Co., Williamsport, Pa., has acquired 3-acre tract adjoining plant for addition, for which plans will be drawn soon.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Sept. 26 for two motor-driven gas-fired rotary furnaces (Circular 276); until Sept. 27 for 25,200 rounds, 37-mm. shot for target practice, with rotating band and windshield assembled (Circular 222).

BUFFALO DISTRICT

Worthington Pump & Machinery Corp., Harrison, N. J., has approved plans for one-story addition to plant of its subsidiary, Moore Steam Turbine Corp., Wellsville, N. Y., manufacturer of steam turbines and parts, reduction gears, etc., for expansion in erecting and testing divisions. Cost about $150,000 with equipment.

United States Engineer Office, Federal Building, Buffalo, asks bids until Sept. 26 for two steel propeller shafts, without nuts (Circular 351).

American Fork & Hoe Co., Dunkirk, N. Y., has approved plans for four one-story additions, 65 x 190 ft., 60 x 145 ft., 50 x 130 ft., and 24 x 80 ft., for expansion in production divisions. Cost close to $100,000 with equipment. Main offices are at Cleveland.

SOUTH ATLANTIC

John Deere Plow Co., 326 Nelson Street, S. W. Atlanta, Ga., with main plant at Moline, Ill., will take bids soon for new one-story factory branch, storage and distributing plant. Cost close to $50,000 with equipment. C. S. Mastin is manager at Atlanta.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 26 for one motor-driven press brake (Schedule 7165) for Charleston, S. C., yard.

Upchurch Packing Co., 16 Brady Avenue, Atlanta, Ga., meat packer, plans rebuilding part of plant recently destroyed by fire. Loss about $50,000 with equipment.

WASHINGTON DIST.

United States Engineer Office, Navy Building, Washington, asks bids until Sept. 27 for four double purchase winches, hand-power, for wire rope, with cast or malleable iron drum and gears, and steel plate or malleable iron frame (Circular 45), two 18-in., 90-deg. and two 18-in., 45-deg. pontoon pipe elbows (Circular 41), one gasoline-electric pumping unit, with accessories (Circular 44).

Crown Cork & Seal Co., Inc., Eastern Avenue and Kresson Street, Baltimore, plans one-story addition to branch plant at 320 Carlaw Avenue, Toronto, Ont., operated in name of Crown Cork & Seal Co., Ltd., totaling about 40,000 sq. ft. of floor space. Cost close to $75,000 with equipment.

Ordnance Officer, Edgewood Arsenal, Edgewood, Md., asks bids until Oct. 3 for one variable speed conveyor for shell-painting, including painting hood and auxiliary equipment (Circular 1).

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Sept. 25 for one sheet metal ventilating duct (Circular 103); until Oct. 2, one ethylene gas holder, double-lift, 100,000 cu. ft. capacity (Circular 81); until Oct. 3, one ethylene drier, complete (Circular 90), 156 steel chemical containers, each one-ton capacity (Circular 102), one alcohol feed pump, one thylene compressor, two vacuum pumps and two sump pumps (Circular 85).

American Agricultural Chemical Co., 2225 South Highland Avenue, Baltimore, commercial fertilizers, etc., has let general contract to Maryland Metal Building Co., Inc., McComas and Race Streets, for one-story addition to plant at 2272 South Clinton Street. Cost close to $40,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 25 for one motor-driven bolt threader (Schedule 3603); until Sept. 26, four diesel engine crawler shovels, with alternate bids on five to eight such units (Schedule 3606), 37,000 ft. of rigid steel conduit, 30,750 conduit bushings, conduit couplings, conduit elbows, copper cable, bare copper wire, copper magnet wire, insulated electric cable, etc. (Schedule 3593); until Sept. 28, 20 solid manganese steel frogs, 20 split switches, 16½ ft. (Schedule 3597).

Bureau of Yards, Navy Department, Washington, asks bids until Oct. 4 for one-story sub-assembling shop, 100 x 600 ft., at Norfolk Navy Yard, Portsmouth, Va. (Specifications 9331).

SOUTH CENTRAL

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Sept. 26 for one full-revolving 40-ton electric gantry crane for construction plant at Kentucky Dam; 1½-cu. yd. diesel engine full-revolving crawler-type shovel for construction and maintenance division; galvanized steel transmission towers for 220-kv. double-circuit Wheeler-Columbia transmission line No. 2, including river crossing.

T. A. Belcher Lumber Co., Birmingham, plans steam power plant at mill in West End district, to replace unit recently destroyed by fire. Cost close to $40,000 with boilers and auxiliary equipment.

Womwell Auto Parts Co., 151 East Short Street, Lexington, Ky., has approved plans for two-story rear addition, 35 x 52 ft., for storage and distribution. Cost close to $45,000 with equipment. Warfield N. Gratz, 148 Barr Street, is architect.

United States Engineer Office, Louisville, asks bids until Oct. 13 for one 10,000-gal. elevated water tank and tower at Lock 47, Ohio River.

SOUTHWEST

Alabama Pipe Co., 2800 Eighth Avenue North, Bessemer, Ala., cast iron pipe and fittings, has purchased about six-acre tract at North Kansas City, Mo., in vicinity of Missouri River, for new plant. It will comprise several one-story units, about 75,000 sq. ft. of floor space, with modernized foundry for large output. Present plant will be removed to new location, where operations will be concentrated. Cost close to $175,000 with equipment.

State Building Commission, Edgar M. Egan, executive secretary, Bi-Partisan Advisory Board, Merchants' Bank Building, Jefferson City, Mo., will take bids at once, closing early in October, for power plant at local auxiliary prison, with diesel engine-generating units and accessory equipment. Cost about $50,000; also for extensions and improvements in power plant at local State prison, including boiler units and other equipment in steam division. Cost about $110,000. Baumes Engineering Co., Railway Exchange Building, St. Louis, is consulting engineer.

Griesedieck Brothers Brewery Co., 1920 Shenandoah Avenue, St. Louis, plans two-story addition, 90 x 150 ft., on Lami Street, for storage and distribution. Cost over $50,000 with equipment. Janssen & Janssen, Chemical Building, are architects.

Charles W. Bennett, 821 Jefferson Street, Topeka, Kan., has let general contract to M. W. Watson, National Bank of Topeka Build-

ing, for one-story machine shop, 36 x 55 ft., at 912 Quincy Street.

Republic Oil Refining Co., Second National Bank Building, Houston, Tex., plans expansion and improvements in oil refinery at Texas City, Tex., including cracking plant for gasoline division, steel tank storage additions and other work. Cost about $1,000,000 with equipment. Company also will build new steam-electric power plant at same refinery, with installation of turbine-generator units, oil-fired boilers and auxiliary equipment. Cost close to $250,000 with equipment.

San Antonio Brewing Association, 312 James Street, San Antonio, Tex., plans one-story addition, 55 x 195 ft., for new mechanical-bottling department, storage and distribution. Cost close to $50,000 with equipment. Leo M. J. Dielman, 145 North Street, is architect.

WESTERN PA. DIST.

Kendall Refining Co., Bradford, Pa., has let contract to M. W. Kellogg Co., 225 Broadway, New York, engineer and contractor, for one-story addition for an oil-treating unit for lubricating oil division. Installation will include furnace, treating towers, fractionating towers, tanks and auxiliary equipment. Bulk storage plant also will be increased by additional steel tanks of about 60,000-bbl. capacity. Cost close to $250,000 with equipment.

Jamestown Paint & Varnish Co., Jamestown, Pa., has let general contract to Holobar Construction Co., Cochranton, Pa., for one and one-half story plant, to replace structure recently destroyed by fire. Cost close to $100,000 with equipment.

United States Engineer Office, Huntington, W. Va., asks bids until Sept. 25 for enameled metal gage strips for locks Nos. 14-27, inclusive (Circular 57).

NEW ENGLAND

Bureau of Yards and Docks, Navy Department, Washington, will take bids late in November for additions and improvements in dry dock at navy yard, South Boston, Mass., for which an appropriation of $2,545,000 is available, including equipment.

M. B. Mfg. Co., 1060 State Street, New Haven, Conn., mechanical specialties, has let general contract to Kelley-Wood Construction Co., 39 Center Street, for one-story machine shop, 60 x 122 ft. Leo F. Caproni, 1221 Chapel Street, is architect and engineer.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Sept. 25 for two air-tempering, recirculating, gas-fired furnaces, 30 x 48 x 48 in. (Circular 60), two 12-in. motor-driven shapers (Schedule 66), one enclosed type contour measuring projector (Circular 64); until Sept. 26, two sets of broach inserts, with broach holder for each set; and two fixtures each to hold two components (Circular 54); until Sept. 27, one motor-driven centerless grinder and one hob, reamer and cutter grinder (Circular 59), 25,000 or 50,000 clip steel ejectors (Circular 58), seven light-type milling machines (Circular 61).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 26 for five motor-driven heavy-duty lathes (Schedule 7173) for Portsmouth, N. H., Navy Yard; until Sept. 29, 1000 lb. welding electrodes (Schedule 7212) for Boston yard.

MICHIGAN DISTRICT

Bohn Aluminum & Brass Corp., Lafayette Building, Detroit, brass and bronze castings and forgings, bronze bearings, etc., plans new one-story plant, 200 x 320 ft., at Adrian, Mich., for which bids will be asked soon on general contract. Cost over $125,000 with equipment.

Precision Spring Co., 15400 Woodrow Wilson Avenue, Detroit, steel springs, etc., has let general contract to Austin Co., Curtis Building, Detroit, for one-story addition. Cost about $45,000 with equipment.

American Furnace & Foundry Co., Milan, Mich., has work under way on one-story addition for expansion in foundry and cleaning department, which divisions will be transferred from main plant to provide greater space for assembling operations. Cost about $45,000 with equipment.

John Bean Co., Lansing, Mich., spraying machinery and parts, plans one-story addition, for which bids will be asked soon on general contract. Cost close to $50,000 with equipment. Lee and Kenneth Black, Lansing, are architects. Company is a subsidiary of Food Machinery Corp., San Jose, Cal.

Fleming Mfg. Co., 1250 N. Main Street, Ann Arbor, Mich., manufacturer of oil filters, has started construction of a two-story addition, with frontage of 100 ft., which will be first unit of a new plant, and will more than triple capacity of present factory. Parent office of company is at East Providence, R. I.

OHIO AND INDIANA

Fisher Brass, Inc., East Ninth Street, Marysville, Ohio, brass, bronze and allied metal products, will take bids soon on general contract for one-story addition, 75 x 200 ft., for storage and distribution. Cost over $50,000 with equipment.

Goodyear Tire & Rubber Co., Akron, Ohio, has acquired about 60-acre tract near St. Marys, Ohio, for new plant exclusively for manufacture of mechanical rubber goods. Initial unit will be one-story, 100 x 500 ft., with auxiliary structures, machine shop, power house and other mechanical departments. Cost close to $1,000,000 with machinery.

Bud Radio, Inc., 5205 Cedar Avenue, Cleveland, radio equipment and parts, has let general contract to J. C. F. Shafer, Caxton Building, for three-story addition, 50 x 200 ft., partly for storage and distribution. Cost about $75,000 with equipment. Leonard L. Broida, 1643 Lee Road, is architect.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Sept. 25 for 120 10-ton, 232 5-ton, and 36 3-ton hydraulic jacks (Circular 228), starter assemblies (Circular 231), cabinet screw drivers and about 6000 common screw drivers (Circular 235), 80 tinners' furnaces (Circular 226); until Sept. 26, bracket assemblies for engine cowl flap support suspension, and engine cowl flap support suspension lugs (Circular 233), motor-driven precision ball-bearing bench lathe (Circular 232), fuel mixture type indicator assemblies (Circular 219), one aerial portable laboratory (Circular 239).

Meese, Inc., Madison, Ind., manufacturer of iceless shipping containers, etc., plans rebuilding part of plant recently destroyed by fire. Loss close to $100,000 with equipment.

Peter Eckrich & Sons, Inc., Fort Wayne, Ind., meat packer, has approved plans for extensions and improvements, including additional equipment. Cost close to $45,000.

MIDDLE WEST

Lincoln Bottling Co., 4343 North Central Park Avenue, Chicago, has asked bids on general contract for one and one-half story addition, 55 x 140 ft., for storage and distribution. Cost close to $45,000 with equipment. Edward H. Nordlie, 4825 North California Avenue, is architect.

Barnes Drill Co., 814 Chestnut Street, Rockford, Ill., has begun erection of one-story addition, 75 x 75 ft., for which general contract recently was let to E. W. Schmeling & Sons, Inc., 1031 School Street. Cost close to $40,000 with equipment.

General American Transportation Corp., 135 South LaSalle Street, Chicago, plans early removal of motor-bus manufacturing division of Gar Wood Industries, Inc., 7924 Riopelle Street, Detroit, to one-story building at Hegewisch, Ill., adjoining works of Pressed Steel Car Co. Additional equipment and facilities will be provided at new location. Company will be operated as a new division of purchasing company.

United States Engineer, Missouri River Division, Davidson Building, Kansas City, Mo., asks bids until Oct. 2 for one 38,889-kva. and one 16,667-kva. a.c. electric generating units and auxiliary equipment for hydroelectric power plant, Fort Peck, Mont.

George Gorton Machine Co., Thirteenth Street, Racine, Wis., milling machines and other machine tools and parts, has let general contract to Johnson & Henrickson, 504 Augusta Street, for one-story addition, 60 x 100 ft., with crane bay running entire length of building. Cost over $75,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Town Council, Greenfield, Iowa, asks bids until Oct. 3 for extensions and improvements in municipal electric power plant, including new 600-700-hp. diesel engine-generator unit, exciter, exhaust silencer, waste heat boiler, air filter, tank and auxiliary equipment. Cost about $92,500. Stanley Engineering Co., Muscatine, Iowa, is consulting engineer.

PACIFIC COAST

Columbia Steel Co., 1054 Fourth Avenue, South, Seattle, has let contract to Bjarde Construction Co., Green Building, for foundations for new one-story storage and distributing plant, 76 x 415 ft., divided into two bays, each with overhead electric traveling crane. Cost close to $100,000 with equipment. Company is a subsidiary of United States Steel Corp.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Oct. 4 for three-story paint shop, 60 x 280 ft., boiler plant and transformer station at Mare Island Navy Yard (Specifications 8994); also bids (no closing date stated) for new graving dock at Puget Sound yard, Bremerton, Wash. (Specifications 9400).

Los Angeles Water and Power Bureau, 207 South Broadway, Los Angeles, will take bids at once on general contract for one-story mechanical and utility shop, 116 x 210 ft., at Boulder City, Nev., to be used in conjunction with power supply now being secured from Poulder dam hydroelectric power plant of Government. Cost over $85,000 with equipment.

Bureau of Reclamation, Denver, asks bids until Sept. 29 for two 17 x 9 ft. 8-in. radial gates and two 7500-lb. double-drum, motor-driven radial gate hoists for wasteway, Yakima Ridge Canal, Yakima, Wash., project; also radial gates and gate hoists, with accessories, for Fruit Growers' dam project, Colorado, and Coachella Canal, All-American Canal System, Boulder Canyon project (Specifications 1288-D).

Gatewood Lumber & Plywood Co., Roseburg, Ore., care of E. E. Gatewood, 2210 Tenth Street, North, Seattle, head, recently organized with capital of $1,000,000, plans power house at new lumber and plywood mill on Myrtle Creek, near Roseburg; also will build pumping station, machine shop and other mechanical units. Entire project will cost over $500,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 26 for flexible metallic tubing (Schedule 7108) for Puget Sound Navy Yard; until Oct. 3 for 3600 cylinder valves for compressed and liquefied gases (Schedule 7161) for Mare Island yard.

FOREIGN

City Electric Light Co., Ltd., Brisbane, Queensland, Australia, asks bids until Nov. 15 for sluice-type ash-handling plant, including ash bunker and grab bucket (Specifications 272); until Nov. 2 for quantity of 11,000 and 415-volt metalclad switchgear (Specifications 267).

Dominion Foundries & Steel, Ltd., Depew Street, Hamilton, Ont., will take bids at once on general contract for three one-story additions, 55 x 480 ft., 180 x 240 ft., and 120 x 240 ft., for expansion in pickling, storage and distribution, raw material and other divisions. Cost over $350,000 with equipment. Hutton & Souter, Piggott Building, are architects.

THIS WEEK'S MACHINE . . . TOOL ACTIVITIES . . .

. . . Broad demand puts domestic orders ahead of foreign business last week . . . All types of manufacturers buying, although Government military demands are a factor . . .

Cincinnati Reports Domestic Demand Ahead of Foreign

CINCINNATI—The past week saw a very sharp spurt in machine tool demand in this area, particularly from domestic users. In fact, the increase from home sources has been so active that the trade generally reports that the domestic proportion of current demand is now outweighing that from foreign sources. England, France, Russia, Japan are still active, however, in the current market, with some small demand coming from the Scandinavian sources. Central European users are not in the current market. While manufacturers are reluctant to reveal sources and size of current orders, they indicate current business is for substantial amounts, but there are no orders of the tremendous size that were received during the first World War.

Production in district plants has been stepped up, although there is still a small margin before the industry can be said to be going at full tilt. Delivery on some types of machines, such as lathes, planers, drills, some types of shapers are about up to contract promises, but other types of machines are becoming more and more extended. Some plants are now practically booked for the rest of this year and well into next year, but there are a few with still some capacity unused.

Inquiry continues to be heavy and the undertone of these current requests is very definitely sincere. Question of the supply of skilled labor is beginning to disturb the market. Manufacturers generally report there is a scarcity of skilled help and, in fact, some employment agencies in town have made public statements to the effect that "any skilled labor, that is not too old" can find employment at the present time. Opinion on the question of foundry capacity to take care of an upsurge equal to that of the 1914 to 1918 era is still somewhat divided. A number of men seem to feel that foundries could not adequately meet a full demand but others seem to feel that if there is a sufficient amount of labor available, that any demand that the local industry places upon the melters can be fully met.

Broad Domestic Demand Added to New Foreign Volume

CLEVELAND—Requirements of Canada, England, France, Italy and Japan continue heavy. Meanwhile, domestic demand is spreading wider day by day, as industrial plants which are farther removed from the primary fields become busier. Machine tool deliveries have already become so extended that the situation overshadows prices in the minds of buyers. Four-month promises are not uncommon and in a few instances delivery dates are much more extended. All buyers are anxious to close immediately on needed equipment rather than suffer any delay through engineering surveys or other services offered. All in all, producers face one of the most critical production problems encountered in a long time. Yet with vivid memories of wholesale cancellations following the armistice in 1918, the need for caution is expressed on all sides.

Reports of the scarcity of skilled workmen are already being heard frequently. Twenty-four hour production is common at all machine tool producers' plants in this district now. Many have doubled their forces since May.

Difficulty in obtaining vessel space for shipments abroad also is reported. Many ocean going freighters have been withdrawn from their regular runs and assigned elsewhere. Certain neutral countries have prohibited their vessels from calling at ports of belligerent nations. Due to rising insurance rates and wartime wages, rates on such vessels as are available have advanced swiftly.

Standard Machine Tools In Active Demand in Detroit

DETROIT—Machine tool inquiries and orders have increased in Detroit in the last two weeks. Largely they are for peace-time requirements and are in anticipation of higher prices or difficult delivery situations. Small plants outside the automobile industry are active in these inquiries and buying. Many inquiries which have been on the cards of machine tools companies for months have borne fruit within the last fortnight. Many companies, including automobile manufacturers, have already asked for protection on prices and delivery dates on equipment for which they have not yet had time to formulate inquiries. Standard machine tools lead the list at present since it is more difficult to anticipate requirements in special machinery. Steel companies report a great deal of activity in material for machine tool bases. The aircraft industry has been one of the best prospects recently for surface finishing equipment.

Sales Continue at High Level In the New York Area

NEW YORK—Machine tool dealers in this district indicate that there has been no diminution in the large volume of orders received since war was declared. With August a favorable month (for one of the leading dealers the best this year), September started off with a comfortable backlog of undelivered orders. In the 10 days between Sept. 5 and 15, these backlogs have shot up to new heights. In that period, one dealer reports a volume of new business equal to the normal volume of a month and a half. With delivery periods rapidly lengthening, firms in all lines of metal working are covering their early requirements by ordering tools. Beneath this general activity, the firms that have lent chief support to the market earlier in the year have also stepped up their buying tempo. Reference is made particularly to aircraft engine and accessory manufacturers and to firms with Government contracts. The arsenals and Navy yards are also active. The Portsmouth Navy Yard is in the market; Watertown arsenal opened bids last Friday on turret lathes, and other machinery is up for bid; Springfield armory is active and so is the Picatinny arsenal. A local concern has bought equipment within the last week for torpedo manufacture for the Navy, including several 36-in. lathes, and one of the steel companies has bought lathes for shell work. Other buyers who have made fairly substantial commitments this month included machine tool builders and shoe machinery makers.

Delivery promises are becoming longer. One prominent builder is selling some machines on two weeks' delivery out of stock. Many other items of its line, however, are being quoted for January delivery and some as late as April. Turret lathes are still available on six to eight weeks delivery, but munitions business here and abroad is adding to mounting backlogs.

Arsenals and Navy Yards Active in the East

BOSTON—For the Portsmouth, N. H., Navy Yard, the Government is in the market for medium duty engine lathes, motor parts and spare parts; for the Watertown, Mass., arsenal, a vertical shaper; for the Springfield, Mass., armory, a lathe with rotating cutters, two tool room tilting head surface grinders, six broaching machines with vertical surfaces, one motor driven high speed light drilling machine, seven hand feed horizontal surface grinders, and one precision bench lathe.

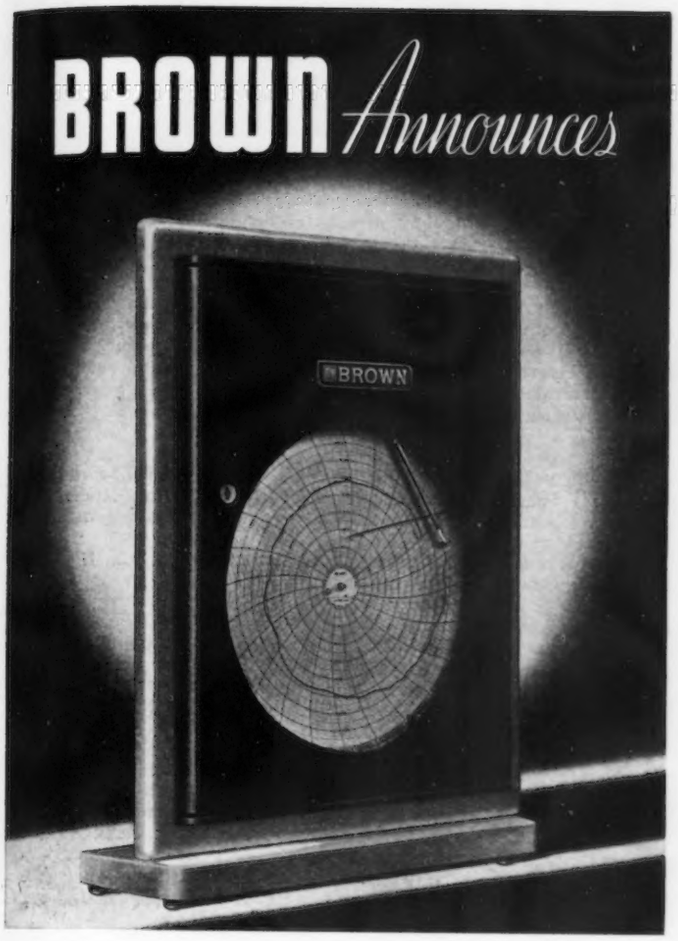
Harnischfeger Corp., Milwaukee, was awarded the electric overhead traveling bridge cranes required by the Boston and Portsmouth Navy yards.

Bureau of Yards and Docks, Washington, will close bids Sept. 27 on four 40-ton and eight 30-ton standard gage, eight wheel type locomotive cranes for the New York and Portsmouth Navy yards.

Machine Tool Index Continues Above 200

CLEVELAND—The index compiled monthly by the National Machine Tool Builders' Association shows a decline in August from July, but the figure is still above 200 for the fourth consecutive month. August at 206.5 dropped 24 points from the 230.9 attained in July. The three-month average is down to 216.3 from 220.8 at the previous report. September is expected to show a sharp gain due to the influx of orders following the outbreak of European hostilities.

BROWN *Announces* *a New Thermometer*



With justifiable pride The Brown Instrument Company presents the latest development in temperature and pressure recorders, indicators and controllers.

These new temperature and pressure instruments are entirely new inside as well as out. Advanced design of the operating mechanisms provides a new conception of *accurate measurement with simplicity*—the result of years of research and field testing under actual operating conditions by Brown Engineers.

The classic, simple lines of the modern streamlined case—styled by Henry Dreyfuss, designer of the "Twentieth Century Limited"—give added beauty and distinction to practical and serviceable instruments.

For modern panel mounting they blend with the panel surface and surrounding instruments to provide the much-wanted flush appearance.

Available with mercury, vapor or gas-actuated thermal systems—built to withstand vibration, shock and over-range temperatures.

ADVANCED DESIGN

Assures
Accurate Measurement
with Simplicity

•

MODERN RECTANGULAR CASE

Styled by HENRY DREYFUSS

Designer of the "Twentieth Century Limited"

Advanced Design Embodies:

SPIRAL ACTUATING ELEMENTS: Powerful, flat spiral, ample torque, especially heat-treated to insure permanent calibration. Have exceptional over-range capacity.

OVERLOAD SAFEGUARD: A special safety link between actuating element and pen arm contains a two-way spring overload release which also protects the mechanism from damage if the pen is moved in either direction manually.

PEN ARM: Stainless steel, 8" long, ribbed reinforcement, permits pen travel of 4¾".

RESILIENT MOUNTING: A rigid, flat sub-plate with 3-point, resilient suspension mounting carries all moving parts. Insures permanent alignment.

CHART DRIVE: Chart is firmly secured to driving mechanism by tapered hub and tapered chart positioning stud. Charts are punched to correspond with tapered studs on driving hub.

AUTOMATIC CHART TIMING: Charts when renewed are automatically in time; as the tapered position stud is in effect the hour hand of the electric clock.

RECTANGULAR CASE: Die-cast aluminum, dust and moisture-proof. Permits flush or front-of-board mounting.

The above-mentioned features are but a few of the many new developments found in the new Brown Thermometer and Pressure Recorders

For full details write The Brown Instrument Company, *a division of Minneapolis-Honeywell Regulator Co.*, 4483 Wayne Avenue, Philadelphia, Pa. Offices in all principal cities. Toronto, Canada: 117 Peter St. . . . Amsterdam-C, Holland: Wijdesteeg 4. . . . England: Wadsworth Road, Perivale, Greenford, Middlesex. . . . Stockholm, 16, Sweden: Nybrokajen, 7.

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Like the angle type WESTON Thermometers now so popular throughout industry, this new *straight stem* WESTON is of all-metal construction. In addition, it employs a perfected *direct drive* . . . eliminating all need for troublesome gears. All the other features which distinguish WESTON Thermometers, such as easily read scales . . . ability to withstand over-temperatures . . . ease of mounting . . . sustained accuracy within 1%, etc. . . . have been retained.

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WESTON INDUSTRIAL TEMPERATURE GAUGES

JUST BETWEEN US TWO

Mazdas Burned Not in Vain

For months the editors have been burning midnight Mazdas on the Machine Tool Show Number, scheduled for next week. So when the news came that the show had been called off we felt like a producer obliged to put on "Hamlet" with the melancholy Dane suddenly down with quinsy sore throat.

But only for a moment. With the initial brow-clutching period past, an obvious fact emerged: that without the show the need for a special issue featuring the new tools increases vastly.

Therefore, the editors redoubled their efforts, and your hunger for information about the machine tool makers' latest offerings will be satisfied by next week's handsome, hefty edition.

Dunked

With pride we announce that William F. (*"On The Assembly Line"*) Sherman, our Detroit editor and a gliding expert of no little repute competed in the American Open soaring meet held recently at Frankfort, Mich.

He was one of the three to land in Lake Michigan. His glider was saved and so was he.

Easy Does It

It seems to us that those who emulate the little triphammers dentists used to use in applying gold fillings, by prefacing their claims with a little "give," get their points over fastest.

Which is why we like this line in The Otto Konigslow Mfg. Co.'s stamping ad in the "Parts Made to Order" Section, *"If we can't make it, will tell you who can."*

Zephyr

Even your favorite family journal occasionally tempers its claims with a becoming bit of modesty. We could say, for example, that we are the country's most widely quoted trade paper, which is what we suspect. But as we cannot prove it, we will merely remark that to the hundreds of newspapers that quote us is added the Hurricane, W. Va., *Breeze*.

Tip

Better clip that series on steel standardization. The third installment of it is on page 46. Demand is heavy and copies of the issues containing the first two installments will soon be scarce.

Wrong! Professor

Albert Mitchell, WOR's "The Answer Man," writes:

> *"I attempt to answer any question submitted by the radio audience. I've heard it said that The Iron Age is the first and oldest trade paper ever published. Can you prove this?"*

Nope, and we won't even try. First U. S. trade paper was the *Dry Goods Economist*, b. 1846 and succeeded in 1938 by the *Department Store Economist*. The oldest *existing* trade paper is The Iron Age, started in 1855.

Oases in a Desert of 6 Pt.

To make certain that all those whose paths can be smoothed by your favorite family journal are made aware of its existence, we wade occasionally through Dun-Bradstreet's—no thrilling task, but brightened by learning that Clara Boop runs a Lima, O., cigar store; Dayton H. Neighborgal has a general store in Logan, O.; Brownie B. Bickes makes burial vaults in Springfield, Ill., and a grocery store in Kent, O., is owned by Jake Dubb.

Gentle Monickers

Don James, our Cleveland editor, who exceeded our drugstore dictionary's elastic limit by using "accicularity" in his recent article on austempering, observes that the labor editors of the *Cleveland Press* and the *Pittsburgh Press* are respectively Messrs. Meek and Lamb.

And Sam DeWolf finds a Toronto service station selling "Red Indian" lubricants is owned by a man named Savage.

Puzzles

J.M.Elliott's Aug. 31 example in division has many correct answers, the master minds find. J. E. Morelock sends in 124)10020316(80809 and J.M.M. submits four—930)10048650-(10805, 940)10160460(10809, 950)10267600(10808 and 960)-10375680(10808.

"I", in last week's problem is 9.6 years old; mother, 38.4; sister 16.8, and father 50.4.

Unless it got the axe along with "squads right," "parade rest," "port arms," etc., in the recent upheaval in infantry drill regulations, a platoon consist of 50 men. How many pickets of 6 men each can be formed from a platoon, using every possible combination of men?

—A. H. D.